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THE ANNALS OF OPHTHALMOLOGY

A QUARTERLY JOURNAL AND REVIEW OF
OPHTHALMIC SCIENCE

FOUNDED BY JAMES PLEASANT PARKER

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MERMOD-JACCARD BUILDING,
ST. LOUIS, MO., U. S. A.

VOL. XXI.
1912.

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THE ANNALS OF OPHTHALMOLOGY

Vol. XXI

JANUARY, 1912

No. 1

OXYCEPHALY AND OPTIC ATROPHY.

AARON BRAY, M. D.,

PHILADELPHIA.

Of the various types of cranial deformities, the oxycephalic type is the one that very often gives rise to optic neuritis. This type of cranial deformity is designated in ophthalmic literature by the term thurmschädel. Strictly speaking, morphologically there is some slight difference between thurmschädel and the oxycephalus or Spitzkopf of Virchow, and Enslin has called attention to this fact; but I employ this term as the common accepted term in ophthalmic circles. It certainly conveys well to the mind of the reader a typical and characteristic skull that can at once be clinically recognized as a factor in some visual disturbances, and occasionally as the cause of total blindness. This type of skull, as the name implies, is characterized by a steeple-shape or dome-like head. Without taking into consideration the various measurements, we find this head elongated and higher, somewhat flattened laterally, and the parietal bones sloping upward, becoming narrower as they reach the point of union. The cranium appears unusually high and narrow, and looks as if some pressure has been applied laterally to flatten it. The sagittal suture shows a marked bony elevation, a compensatory hyperdevelopment, as if pressed upward from within. This elevation is also no-

ticeable at the region of the anterior fontanelle. The orbital cavity has also undergone some changes. As a result of the lateral flattening, the orbital cavity is somewhat narrow and shallow, often too small to properly contain in equilibrium the eyeball. The optic foramen is also changed; it is either too narrow, or is constricted as a result of the general deformity, or as a result of an hyperostosis. The cause for the cranial deformity is stated to be, as far as our present knowledge goes, a premature ossification of the coronal suture with simultaneous compensatory hypertrophy of the sagittal sutures as well as the bregma. Those interested in the study of the cranial deformity as such, will find the articles of Enslin, Dorfman, Oliver, and Patry of much interest.

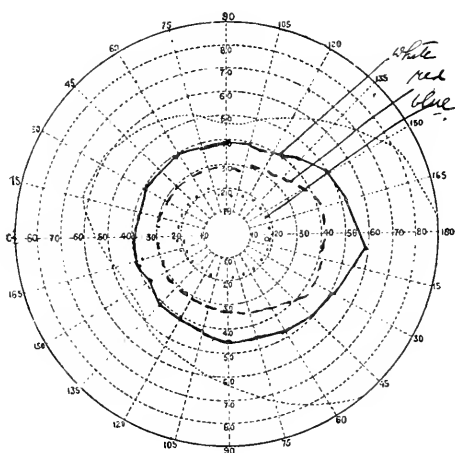
It is the ocular condition that I am concerned with in this paper, and I refer to the cranial deformity only in so far as it gives rise to a series of symptoms which may be said to be characteristic. We cannot trace the nomenclature of *thürmschädel*, and do not know who employed the term first in connection with ocular manifestations. Knapp, however, uses the term *oxycephalic skull* as synonymous with *thürmschädel*, and this, according to Virchow, is a synostosis of the parietal with the occipital and temporal bones, associated with a compensatory development of the frontal bone and the anterior fontanelle. This description of Virchow is probably the condition of both cases reported in this contribution.

Before entering into an analysis of the cases reported in the literature with reference to the visual disturbances, and a discussion of the advisability of the decompression operation, I will report briefly two cases that came under my observation.

CASE 1.—Man, aged twenty-five, fairly built, with clean mental faculties and a marked *thürmschädel*. In 1902, while at his dinner, he suddenly became blind. He afterward regained some sight, but eventually he was totally blind. I examined him five years after the onset of his blindness and found the following ocular conditions: Both eyes protruded, left eye was divergent; there was a marked lateral nystagmus, while the palpebral fissures were markedly oblique. The pupils were dilated and there was no reaction to light. Ophthalmoscopic examination showed clear media, disks large and irregular, very white lamina cribrosa, arteries well defined and narrow, veins dilated and tortuous. The retina was oth-

erwise apparently normal. Both eyes were totally blind. The family and personal histories were negative. No measurements of the skull were taken, but the patient presented a typical clinical oxycephalus.

CASE 2.—B. L., aged fourteen, consulted me in July, 1911, on account of visual disturbances. Father and mother living and well, four brothers and sisters living and well. Our patient is the youngest in the family, was born without instrumental aid, was well until two years old, when he developed measles. Following the attack of measles the child suffered from severe headaches and weak eyes, vomited frequently but had no convulsions. These symptoms lasted until the age



of seven, when they disappeared. The left eye became weaker until finally, at the age of eight, he noticed that the eye was totally blind. He is sure that this blindness did not come on suddenly, but gradually, and that the right eye was also becoming impaired.

At the age of twelve he consulted an oculist, who diagnosed the case as optic atrophy. The left eye was divergent, but he could not tell how long it had been so, but thought since childhood. The divergence probably followed measles. At present he is free from headache or dizziness except when stooping, and in fact feels perfectly well.

External Appearance.—Palpebral fissures somewhat oblique, eyes protrude, left eye diverges about 45 degrees. Cornea normal, pupil O. D. reacts well to light accommodation and convergence. Pupil O. S. is larger than that of O. D., does not react to direct light stimulus, but consensual reaction is present. Ophthalmoscopic examination reveals clear media, disk oval, edges well defined, slight chorioidal ring, greenish in color, lamina cribrosa clearly seen, arteries narrow, veins slightly dilated and tortuous, fundus near the disk somewhat disturbed, otherwise normal. The conditions in O. S. are the same, but more marked.

The boy is of normal size and mentally bright. His head is somewhat elongated; the flattened parietal bones slope upwards, meeting at the point of union in a dome-like fashion. Wassermann reaction negative. Urine cloudy, specific gravity 1005, trace of albumen present, no sugar, but an abundance of amorphous phosphates. Vision O. D., 5/9 + ; O. S., blind. Field of vision is markedly and concentrically contracted, as seen in the accompanying diagram. Diagnosis, postneuritic atrophy of the optic nerve associated with cranial deformity.

OCULAR SYMPTOMS OF OXYCEPHALY.

The ocular conditions observed in connection with the oxycephalic skull may be briefly stated to be the following:

Exophthalmos.—Usually both eyes are proptosed. The degree of prominence of course varies in different cases and is in direct proportion to the degree of cranial deformity. In those cases where the orbital cavity is very shallow and narrow, the exophthalmos may reach a degree of practical dislocation of the ball. In some cases only a slight prominence of the globes is observable. In the majority of cases the exophthalmos is well marked. There is rarely any disturbance of motility. The ocular excursions are usually well performed. No paralysis has been noted in the cases recorded. In many of the cases the palpebral fissures have been found to be more or less oblique. This may be due to the general asymmetry of the face, or to the contour of the orbital cavity, and the degree of the exophthalmos present.

Changes in the pupillary reaction are often present, which are of course dependent upon the degree of atrophy of the

optic nerves. Strabismus is present in about 85 per cent of the cases, due often to the fact that one eye is much weaker than the other or is totally blind. The chief ocular condition associated with cranial deformities, and especially with the oxycephalic type, is optic neuritis with a subsequent atrophy of the nerve. The optic neuritis in these cases does not differ from that caused by any other etiologic factor. The disk is swollen, the edges blurred or washed off, as the German has it; the veins are dilated, the arteries are narrow; very rarely retinal hemorrhages may be present. Not infrequently the neuritis extends to the retina, giving the picture of neuroretinitis. The inflammation subsequently subsides and is followed by atrophy. The nerve then becomes pale and eventually greenish-white or absolutely white; the arteries are narrow, but the veins may no longer be tortuous.

Only three cases have been observed during the stage of active neuritis. All excepting the three just mentioned came to observation when a postneuritic atrophy was established. In two cases there was optic neuritis in one eye and an atrophy in the other eye. Most of them showed a bilateral optic atrophy more marked in one eye than the other. The atrophic signs were present, even though vision was still very good. In one of my cases vision was 5/9 +, yet the atrophy in this eye was as marked as in the other eye, which was amaurotic. In some of these cases it is impossible to differentiate a postneuritic from a primary atrophy. All evidence, however, goes to show that the atrophy is of a postneuritic type. All observers practically agree on this point.

Vision.—Bilateral total blindness is said by Enslin to be infrequent. He did not include the 20 cases reported by Meltzer. I find in the 85 cases reported in the literature, including my own cases, 25 cases of total bilateral amaurosis. The visual disturbance in these cases, as in all other optic neuritis cases, depends entirely on the degree of atrophy, which in the majority of cases is absolute in one eye and partial in the other eye. It is sometimes remarkable to observe an eye the ophthalmoscopic picture of which resembles a total atrophy yet which possesses good vision. It may be stated here, as a result of my investigation, that whatever vision is present after the atrophy has reached its height is usually preserved throughout the lifetime of the patient. The visual disturbances usually

appear in childhood, although some cases have come first for observation in later life with some vision remaining in one eye, which tends to prove that vision is preserved after the atrophy has run its course. The disturbance in vision usually manifests itself during childhood, from the age of 3 to 15. If we include the group of 20 cases studied by Meltzer, we have the following results as far as the visual acuity is concerned:

In the 85 cases reported in the literature, bilateral total amaurosis was noted 25 times. Unilateral amaurosis with a high degree of amblyopia in the other eye was noted in 20 cases. Amaurosis in one eye and good vision in the other eye was noted 10 times. High degree of amblyopia in one eye and fairly good vision in the other eye in 15 cases. Vision fair in both eyes in 15 cases. As to age, it must be said that the majority of cases occur in childhood. Even those cases that came to observation later in life, probably on some other ground, and revealed optic atrophy, gave a clear history of weak eyes since childhood. Most of the cases came to observation between 3 and 20 years. As to sex, it is interesting to note that only 15 cases occurred in females. The predominance of this condition in the males is a mystery not yet solved.

The following table will give the age, sex and ocular condition, as far as I could gather, of those cases that could be classified. Meltzer's and Patry's cases are not classified separately.


Author.	Case.	Ocular Findings.	Vision.
1. V. Graefe, 1866.	Boy, age 3.	Bilateral neuroretinitis; pupils dilated, no reaction to light; papillae considerably swollen; dirty gray in color; swelling and haziness extends into the retinae; veins full and tortuous; arteries narrow.	None; Later 5/5.
2. Michel, 1873.	Boy, age 15.	Marked reduction in vision since early childhood; eye-balls prominent; ocular movements free; pupils wide, no reaction to light; absolute amaurosis; ophthalmoscope shows signs of a marked choked disk in its regressive stage; later total atrophy of the nerve; arteries very narrow, veins dilated and tortuous; later parenchymatous keratitis.	O. D., 0. O. S., 0.
3. Schüller, 1881.	Boy, age 7.	O. D., disk pale; marked contraction of visual field. O. S., total atrophy of optic nerve.	O. D., 15/20. O. S., 0.
4. Schüller, 1881.	Boy, age 9.	Marked concentric contraction of the field of vision. Nerve head, O. D., pale; O. S., greenish white; left eye diverges.	O. D., 15/20. O. S., 0.
5. Hirschberg, 1883.	Boy, age 5.	Bilateral regressive choked disk; eyes prominent; left eye diverges; palpebral fissure oblique, disk greenish white, edges irregular but well outlined; no changes in the blood vessels; O. D., marked concentric contraction of the field of vision.	O. D., 15/20. O. S., 0.
6. Hirschberg, 1883.	Girl, age 3.	Bilateral postneuritic atrophy; disk white and hazy; veins dilated and markedly tortuous; some vision preserved.	Not definite.

Author.	Case.	Ocular Findings.	Vision.
7. Hirschberg, 1883.	Boy, age 15.	Orbits short; left eye blind and diverges; right eye amblyopic; field considerably contracted; disk greenish white and hazy; atrophic excavation; no changes in the retinal vessels.	O. D., 0. O. S., amblyopic.
8. Hirschberg, 1883.	Man, age 20.	Oblique narrow orbital fissures. O. D., visual field normal; O. S., diverges; optic disks of both sides white and hazy; retinal vessels markedly full.	O. D., 15/20. O. S., fingers at 5 mm.
9. Hirschberg, 1883.	Boy, age 4½.	Bilateral postneuritic optic atrophy; veins markedly dilated; left eye, a large hemorrhage, triangular in shape, along the course of the inferior temporal veins.	O., ² light perception.
10. Vossius, 1881.	Boy, age 7.	Exophthalmus. O. D., no reaction to light; O. S., reacts sluggishly; optic disk both eyes greenish white, edges hazy and blurred, arteries narrow, veins dilated and tortuous; left eye diverges.	O. D., 0. O. S., fingers. Refraction, low hyperopia.
11. Stood, 1885	Boy, age 4 months.	No evidence of any light perception since birth. Both eyes turn upward so that the cornea is barely visible; bilateral optic atrophy; papillae gray, edges blurred, veins dilated; pupillary reaction preserved.	No light perception. Nine months later light perception is present.
12. Hirschberg, 1885.	Adult, age 20.	Right eye converges; bilateral partial atrophy of the optic nerve following an inflammatory process; white streaks along the arteries; visual field in left eye normal; considerable contraction of field in right eye.	O. D., objects. O. S., 15/20.
13. Pouffick, 1886.	Boy, age 3.	Apparently born blind. Died from meningitis. Autopsy; Narrow optic foramine surrounded by a thickened bony ring; optic sheath compressed; optic atrophy.	Absolute amaurosis.

14.	Manz, 1887.	Man, age 50.	Bilateral postneuritic optic atrophy.	O. D., 0. O. S., objects.
15.	Manz, 1887.	Man, age 40.	Bilateral postneuritic optic atrophy; exophthalmus; left eye diverges.	O. D., 0. O. S., fingers.
16.	Manz, 1887.	Adult.	Bilateral postneuritic atrophy; exophthalmus and divergence.	O. D., 0. O. S., light perception.
17.	Manz, 1887.	Man, age 40.	Postneuritic atrophy in right eye; choked disk with considerable swelling in the left eye. Died from sarcoma. Postmortem: Both nerves show a marked ring-like compression near the foramina optica; partial atrophy of left optic nerve.	O. D., 0. O. S., 6/12.
18.	Friedenwald, 1893.	Adult, age 20.	Bilateral grayish white atrophy of the optic nerve; field contracted.	Markedly reduced in both eyes.
19.	Weiss-Brugger, 1894.	Boy, age 14.	Bilateral exophthalmus; pupils react promptly; slight concentric contraction of the visual field; disk in both eyes pale, bluish-gray; small white spots in the macular region.	O. D., 3/60. O. S., 5/60.
20.	Oeller, 1894.	Boy, age 15.	Papillae pale, edges not well defined; eyeballs prominent; orbits shallow; field of vision normal.	O. D., 3/6. O. S., 3/18.
21.	Oeller, 1894.	Boy, age 15.	Ocular finding as in case number 20. (These cases of Oeller are twins.)	O. D., 3/6. O. S., 3/18.
22.	Groenouw, 1901.	Adult, age 19.	Bilateral postneuritic optic atrophy; arteries narrow; veins normal; eyeballs prominent; left eye diverges; marked defect in field of vision.	O. D., 1/2. O. S., fingers. Refraction, — 2.

Author.	Case.	Ocular Findings.	Vision.
23. Vortisch, 1901.	Boy, age 8.	Papillae in both eyes white, edges not defined; eyeballs prominent; left eye diverges and reacts very sluggishly to light; right eye reacts promptly, and field of vision is normal.	O. D., 5/5. O. S., 0.
24. Friedenwald, 1901.	Woman, age 45.	Bilateral exophthalmus; divergent strabismus; bilateral postneuritic atrophy; but pupils react well; field markedly contracted; perivascularitis present.	O. D., 2/60. O. S., 6/12.
25. Kraus, 1902.	(Colored.) Boy, age 8.	Eyeballs prominent; divergent strabismus; eyes move about to and fro without purpose, and do not fix well; papillae grayish pale, arteries somewhat thin, veins dilated; bilateral exophthalmus.	O., ² apparently fingers from near.
26. Kraus, 1902.	Man, age 29.	Bilateral optic nerve atrophy; arteries thin, veins full; atrophic excavation.	O., ² very little since birth.
27. Enslin, 1904.	Boy, age 16.	Eyeballs prominent; bilateral nystagmus; pupils react well; right eye diverges; bilateral postneuritic optic atrophy; field concentrically contracted.	O. D., 0. O. S., with a — 1.50 sph. lens, 6/10.
28. Enslin, 1904.	Boy, age 17.	Eyeballs slightly prominent; postneuritic atrophy; disk in both eyes is pale and white; field concentrically contracted.	O. D., 5/6. O. S., 5/12.
29. Enslin, 1904.	Man, age 24.	Bilateral greenish coloration of disk; deep physiologic excavation; bilateral concentric contraction of field.	O. D., fingers. O. S., 6/10.
30. Enslin, 1904.	Adult, age 18.	Eyes prominent; left eye diverges; horizontal nystagmus; disk greenish-white; blood vessels normal; bilateral contraction of field vision.	O. D., fingers. O. S., fingers.

31.	Enslin, 1904.	Adult, age 19.	Alternating strabismus; horizontal nystagmus; disk bluish gray, irregular in outline; bilateral concentric contraction of field.	O. D., fingers at 5 m. O. S., fingers at $\frac{1}{2}$ m.
32.	Enslin, 1904.	Woman, age 63.	Left eye, phthisis bulbi; right eye, pronounced atrophy of optic nerve; disk white, edges well defined; slight contraction of field.	O. D., 6/10. O. S., 0.
33.	Enslin, 1904.	Boy, age 5.	Eyes slightly prominent; left eye diverges; right eye disk choked, grayish red in color; papilla swollen, edges not defined, veins filled; left eye postneuritic atrophy, veins filled; concentric contraction of field.	O. D., 6/20. O. S., slight.
34.	Enslin, 1904.	Boy, age 6.	Eyeballs prominent; slight divergence and rotatory nystagmus; disk greenish white in both eyes; field of vision difficult to obtain.	O. D., fingers at 4 m. O. S., fingers at 1 m.
35.	Enslin, 1904.	Boy, age 6.	Bilateral exophthalmus; ocular muscles well balanced; bilateral recent choked disk; optic papillae very prominent; field normal, but blind spot larger.	O. D., 6/8. O. S., 6/22.
36.	Enslin, 1904.	Adult, age 17.	Eye diverges and proptoses; intermittent nystagmus; right eye reacts well; left eye reacts sluggishly; disk greenish-white in color; cones below; veins tortuous; concentric contraction of field.	O. D., fingers at 2 meters. O. S., hand movement at 1 meter.
37.	Enslin, 1904.	Adult, age 16.	External appearance normal; disk grayish white, edges not very well defined; veins tortuous; peripapillary pigment atrophy; field free.	O. D., 6/24. O. S., 6/10.

Author.	Case.	Ocular Findings.	Vision.
38. Euslin, 1904.	Woman, age 29.	Eyeballs very prominent and diverge; facial asymmetry; both disks are greenish white in color, edges not well defined; veins somewhat tortuous; irregular pigmentation around the papilla; marked contraction of field.	O. D., 6/18. O. S., fingers.
39. Euslin, 1904.	Boy, age 17.	Eyeballs prominent; slight divergence; horizontal nystagmus; left eye, disk greenish blue, veins very tortuous; right eye, marked retinitis proliferans.	O. D., not given. O. S., not given.
40. Euslin, 1904.	Boy, age 13. 	Right eye diverges; pupils react well; bilateral optic atrophy; disk, right eye white; left eye greenish, edges blurred.	O. D., light perception. O. S., fingers at 1 meter.
41. Euslin, 1904.	Girl, age 1½.	External appearance normal, pupils react well; bilateral choked disk, passing into atrophy; papillae prominent, dirty gray in color, edges blurred; some hemorrhage into the retina.	O. D., light. O. S., 0.
42. Euslin, 1904.	Adult, age 20.	Externally normal; bilateral postneuritic atrophy; disk greenish-white in color; field slightly contracted concentrically.	With correcting lenses both eyes have normal vision.
43. Euslin, 1904.	Boy, age 8.	Bilateral exophthalmus and nystagmus; bilateral postneuritic optic atrophy; chorio-retinitis; fields contracted.	O. D., 6/30. O. S., 6/30.
63. Meltzer, 1908.	A series of 20 cases.	Not classified, but all presented the picture of bilateral optic atrophy. Nineteen presented divergent strabismus, while one converged; exophthalmus was present in 18, and nystagmus in 19 cases; 17 were rachitic.	All from the Blind Institute.

64.	Oliver, 1905.	Man, age 62.	Exophthalmus; left eye diverges; ocular movements normal; bilateral optic atrophy; left eye affected 33 years after the right; pupils react sluggishly.	O. D., 0. O. S., 0.
65.	Oliver, 1905.	Man, age 35.	Exophthalmus; left eye diverges; bilateral posten- ritic atrophy; right eye reacts well to light; no reaction in the left eye.	O. D., 1/8, O. S., 0.
66.	Hirschberg, 1909.	Girl, age 18.	Divergent strabismus; exophthalmus; bilateral optic atrophy.	O. D., 0. O. S., tolerable.
67.	Dorfman, 1908.	Boy, age 13.	Bilateral exophthalmus; divergent strabismus; ocular movements unimpaired; disks greenish white; edges not well defined; arteries narrow; field concentrically contracted.	O. D., fingers at 20 cm. O. S., fingers.
68.	Dorfman, 1908.	Girl, age 4.	High degree of exophthalmus; ocular movements normal; right eye diverges; disk, right side reddish white, edges blurred, vessels normal; disk swollen 4 diopters; left eye, disk is white, hazy below, veins filled and tortuous.	O. D., 6/30, O. S., 6/60.
69.	Dorfman, 1908.	Boy, age 3.	Bilateral exophthalmus; horizontal nystagmus; bilateral optic atrophy; papillae white, well outlined; arteries somewhat narrow.	Both eyes very low, but cannot be deter- mined.
70.	Kraus, 1907.	Man, age 20.	Bilateral exophthalmus; divergent strabismus; bilateral ptosis and nystagmus; pupils react very sluggishly; postneuritic optic atrophy.	Recognition of light.
71.	Paltracca, 1909.	Boy, age 5.	Exophthalmus; nystagmus; bilateral optic atrophy; history of syphilis and pellagra.	O. D., 5/30, O. S., 0.

Vision.	Case.	Ocular Findings.	Author.
72. Uthoff, 1905.	Boy, age 15.	O. S., phthisis bulbi; but eye is still protruding. O. D., eye proposed, no reaction to light. Postneuritic optic atrophy.	O. D., 0. O. S., 0.
73. Uthoff, 1905.	Girl, age 11.	History of otorrhea; very marked exophthalmus; bilateral optic neuritis and keratitis lagophthalmus.	O. D., 0. O. S., 0.
74. Uthoff, 1905.	Girl, age 1½.	Bilateral postneuritic optic atrophy.	Vision very poor.
75. Gordon, 1911.	Boy, age 8.	Bilateral exophthalmus and nystagmus; bilateral postneuritic optic atrophy; chorio-retinitis; field contracted.	O. D., 6/30. O. S., 6/30.
76. Brav, 1911.	Man, age 26.	Marked exophthalmus; bilateral postneuritic optic atrophy.	O. D., 0. O. S., 0.
77. Brav, 1911.	Boy, age 15.	Bilateral exophthalmus; bilateral postneuritic optic atrophy. O. D., field contracted; O. S., blind.	O. D., 6/9. O. S., blind.

THE CAUSE OF THE OPTIC INFLAMMATION.

In studying the ocular condition, especially the optic neuritis, we must ask ourselves what is the cause of this optic atrophy? Is it dependent upon the cranial deformity, or are both the deformity and the optic neuritis the result of some common etiologic moment? It is indeed impossible to state the cause of the atrophy with any degree of certainty and ascribe a common cause for all cases. Our investigation leads us to believe that each case must be studied by itself from the point of view of its etiology. Four possible causes may be considered, each capable of giving rise to optic neuritis, either alone or in combination.

1. Increase in the intracranial pressure.
2. A basal chronic meningitis following some infectious fever of childhood.
3. Partial stenosis of the optic foramin.
4. Constitutional causes, such as syphilis and rachitis.

Friedenwald suggested that the optic neuritis is the direct result of an increase in the intracranial pressure, and asks whether a decompression operation would not be advisable to prevent blindness. He reasons that as a result of a premature ossification of the coronal sutures, with a compensatory hypertrophy of the sagittal suture as well as the area of the anterior fontanelle, the brain substance is unable to grow in proper proportion, which results in an increased intracranial pressure, which pressure would of course be in direct ratio to the inelasticity and unyielding nature of the bony tissues and the ossified sutures. It may be further argued that the thinness of the bones of the skull as seen in postmortem cases may be accounted for in this way. This intracranial pressure is analogous to the increase in pressure in tumors of the brain. Dorfman, who studied several cases with the aid of the X-ray, reaches the same conclusion as to the cause of the optic neuritis, and follows this theory to its logical conclusion by recommending a decompression operation to relieve pressure and prevent blindness. In fact, he records one case in which, after consultation with Fuchs and Eiselsberg, a decompression operation was performed to relieve pressure symptoms, and with evident good results and temporary improvement of sight. His conclusions are that all cases of thurmschädel optic neuritis during the progressive stage should be treated by this

operative procedure. Against this theory, however, stand out prominently many clinical facts. First, that a great number of cases have no pressure symptoms. Again, even in those cases in which pressure symptoms are present, we find that the symptoms subside without any artificial relief of this pressure. That most of the cases, even where the pressure was high enough to cause a total atrophy with complete amaurosis, are practically free from other symptoms in adult life. The pressure having been present in childhood should, of course, under the circumstances, remain and give constant evidence of its existence until relieved by artificial surgical means. It is furthermore strange to conclude that a diffuse intracranial pressure should so localize itself as to result in a deleterious influence only on the second pair of cranial nerves. Friedenwald's comparison to pressure in tumors of the brain is not well chosen. The symptoms in tumors of the brain, after they have appeared do not disappear, and the patient is relieved only by operation or death, while here the symptoms practically disappear without any interference on the part of the surgeon. Dorfman's case, while interesting from various points of view, is not sufficient evidence to attribute one causal element, viz., "intracranial pressure" to all cases. Not only has the case not been observed for any length of time after the operation, but even if vision had been preserved at the recorded figure of $6/24$, it would still be meager evidence for such generalized conclusions, for in many of the cases reported good vision even as high as $5/6$ or $5/9$ had been preserved years after the optic neuritis subsided and the atrophy had run its course, in which case no attempt to relieve the supposed intracranial pressure had been made. Nor can we entirely ignore other probable prominent and important causes that both clinical and postmortem evidence bring to our attention in favor of a theory that will not stand clinical test. Chronic meningitis has been advanced as the cause of the optic atrophy as well as the cranial malformation, by Hirschberg.* Secondary meningitis following a suppurative rhinitis and osteitis have been found on postmortem investigation in the cases of Manz and Ponfick. Bourneville found a marked thickening of the pia and arachnoid in the chiasm and interpeduncular area.

*Hirschberg in his last article also inclines to the theory of intracranial pressure advanced by Friedenwald.

The finding of Bourneville, while in only one case, cannot be entirely overlooked, when we consider that only five cases came to postmortem examination. But clinical evidence also strongly points to the fact that, at least in a great number of cases, meningitis constitutes an important factor in the causation of the optic neuritis. This meningitis, of a chronic nature, may have been associated with some disease of childhood, or immediately following it. As a matter of course, in many of the histories of these cases we find evidences of meningeal symptoms. Severe headaches are present practically in all cases at the beginning of the disease, convulsions in childhood noted in many of the case histories, and the fact that in a number of the cases the ocular condition as well as the commencing changes in the cranial contour would seem to date from an attack of measles, scarlet fever, pertussis, or some other undefined fever, but especially measles, would suggest strongly the probability of a meningeal condition to account for some of the cases of optic neuritis. That some cases of thurmschädel have been observed without any ocular involvement, does not entirely disprove this theory, and Ambiolet tries to explain this on the ground that in order for chronic meningitis to produce an optic neuritis the region of the chiasm must be affected; a meningeal condition not affecting the chiasm will not produce inflammatory changes in the optic nerve.

Meningitis could not, however, explain all the cases; in fact, some of the cases gave no symptoms of meningeal involvement. In searching for the causal element, therefore, we must not overlook some postmortem evidence which appears to us very important, namely, partial stenosis of the optic foramina as a result of some exostosis. In three cases this interesting pathologic finding has been reported. (Michel, Ponfick, and Manz.) It is also possible that as a result of the lateral flattening of the cranial bones the vertical diameter of the optic foramina is out of proportion to the horizontal diameter, which becomes narrower and thus compresses the nerve.

Of course clinically this cause cannot be demonstrated. It should be remembered, however, that many skulls have been studied by Enslin and Dorfman and others, with regard to stenosis of the optic foramina, with negative result. These skulls, however, were dry and old, so that the negative results cannot entirely counteract the positive findings of Michel,

Ponfick and Manz, but they do indicate that not all cases can be attributed to this cause. Finally, we must also consider the constitutional causes, syphilis and rachitis. In this study of the subject, investigating nearly every case as far as it was possible, I find that in Friedenwald's case the patient was syphilitic. The other writers exclude syphilis merely on the negative history. No Wassermann reaction was taken for reasons obvious, yet Michel, who excludes syphilis in his case, tells us that his case developed parenchymatous keratitis, which is practically always due to hereditary syphilis. In Giulianetti's case the evidences of syphilis in the family were manifest, and the author discarded all other theories and claimed that this specific infection was at the bottom of the optic nerve inflammation. It is a known fact that syphilis produces changes in the bones, and it is possible that in some cases this disease is responsible for the cranial deformity as well as the optic nerve atrophy. Even those cases in which the thickening of the optic foramina has been demonstrated may be attributed to this disease as a syphilitic exostosis. Paltracca also mentions that in his case the bony change in the skull could be attributed to pellagra, and refers to the studies of Agostini and Ceni, who claim that pellagra is capable of producing cranial deformities. Many authors exclude rachitis as a possible causal element. This, too, is not an easy matter when we take into consideration the group of 20 cases studied and reported by Meltzer. Meltzer considers the synostosis merely a rachitic process. Of the 20 cases reported by him, 17 had evidences of rachitis in the bony structures of the body as well as of the cranium, and this evidence must be reckoned with when the etiology of the cranial deformity is considered. In his opinion the rachitic process is responsible for a mild serous meningitis, which in turn gives rise to the inflammation of the optic nerve.

The conclusion which we arrive at is that no single causal factor can be adduced to answer all cases, but that one of the several causes mentioned above may be responsible for both the cranial deformity and the optic nerve inflammation.

TREPHINING.

After having considered the subject from various aspects, the question has been asked by Friedenwald, Is there any

indication for the decompression operation in this condition? Dorfman answers in the affirmative, and in fact performed the operation in one of his cases, with the expressed idea of reducing intracranial pressure and relieving an optic neuritis and restoring some vision and probably minimizing the subsequent atrophy. I fear very much that the operation is not indicated in these cases. First, we have seen that in many cases the causal element is meningitis, in some a stenosis of the optic foramina, in some syphilis, and in others rachitis. These cases would of course receive little or no benefit from the operation; in fact, the patient would only be exposed to a more serious danger. It is also well to consider the fact that all the cases, except four, that are reported, came to the physician with an optic atrophy, partial or total. The most sanguine advocate of decompression would not subject the patient to the serious ordeal of the operation under such circumstances, as there is practically nothing to gain during the regressive stage of the disease. We could, therefore, conclude that only in a very small number of cases would the operation be indicated. But even during the progressive stage of the optic nerve disease the operation is of questionable value. In v. Graefe's cases of bilateral engorgement neuritis, where vision was reduced to mere light perception, we find later, after the optic nerve inflammation subsided, vision was restored to practically normal without surgical interference. Furthermore, we are not convinced that the operation would insure more vision than the ordinary medical treatment. I have no statistics on hand as to the ultimate value of the decompression operation, yet I feel that the result is not permanent even in those cases where the cause is admitted to be an increase in the intracranial pressure. Considering, furthermore, the number of cases that have lived for years with good vision in one or both eyes without operation, one could not with any degree of certainty know when to attribute any result directly to the operation.

Dorfman's case showed some slight improvement, but the case was reported before it was observed for any length of time, so that no conclusion can be drawn from it. On theoretical grounds, after careful study of the subject, I can see no good reason why the decompression operation should be considered at all in connection with optic neuritis in cranial

deformities. As to the treatment of the optic neuritis in these cases, all that can be said is that it is the same as for optic neuritis without cranial deformity, except where the condition is caused by a tumor of the brain, in which case operation is indicated.

CONCLUSIONS.

1. That we have a special form of cranial deformity which is responsible for an optic neuritis with a subsequent atrophy and partial or total blindness.

2. That the cause of the deformity is a premature synostosis of the coronal sutures, with a compensatory hypertrophy in the sagittal sutures and the region of the anterior fontanelle.

3. That this deformity may be brought about (1) by a meningitis following some of the exanthemata, especially measles, (2) syphilis, (3) rickets.

4. That the cause operating in the production of the cranial deformity is also the responsible factor for the optic nerve disease.

5. That intracranial pressure, as suggested by Friedenwald and Dorfman, is not the cause of the optic atrophy.

6. That trephining for the relief of pressure with the expressed view of preserving vision, in the light of our present knowledge is not warranted.

7. That in a considerable number of cases useful vision is maintained.

8. That whatever vision is present after the atrophy has run its course is usually preserved throughout life.

9. That of all the various forms of cranial anomalies, the oxycephalic form is the most frequently associated with optic atrophy.

10. That with our present knowledge of the causation of these deformities, nothing can be done to prevent the development of either the deformity or its subsequent optic nerve diseases.

917 Spruce Street.

BIBLIOGRAPHY.

Graefe, A. v. Ueber Neuro-retinitis und gewisse fälle fulminirender Erblindung. v. Graefe's Archiv, f. Ophthalmology, 1866.

Michel. Beitræge zur Kenntniss der Entstehung der sogenannten Stauungspille. Archive der Heilkunde, 1873.

Schüller. Beitræge zur Pathologie des Sehnerven. Centralbl. f. Augenheilkunde, 1881.

Hirschberg. Sehnerven leiden bei Schadelmissbildungen. Centralbl. f. Augenheilkunde, 1883 und 1885.

Vossius. Ein Fall von neuritischer Sehnervenatrophie. Klinische Monatsbl. f. Augen., 1884.

Stood. Zwei fälle von Amaurose bei Schadelmissbildung. Klinische Monatsbl. f. Augen., 1884.

Ponfick. Ueber den Zusammenhang von Schadelverbildung mit Hirnentzündung und anga borener blindheith Bresslauer. Aerztliche Zeitung, 1886.

Manz. Ueber Schadeldeformitate mit Sehnervenatrophie. Bericht über d. xlv Ophthalm. Versammlung. Heidelberg, 1887.

Friedenwald. Cranial deformity and optic atrophy. Amer. Journ. of the Med. Sciences, 1893 and 1901.

Weiss-Bruegger. Zur Kasuistic der Sehnervenleiden beim Thurmschaedel. Arch. f. Augenheil., 1894.

Oeller. Atlas der Ophthalmoscopie, 1896.

Groenouw. Beziehungen der Allgemeinleiden zu krankheiten des Sehorganes. Graefe-Saemisch Handb. d. ges. Augenheilk., 2 Aufl.

Vorthish. Ueber Sehnerven Erkrankungen bei Thurmschaedel. Inaug-Dissert, Tübingen, 1901.

Kraus. Zur Kasuistic der Sehnerv bei Schadelmissbildung Inaug-Dissert, Giessen, 1902.

Oliver. Blindness from congenital malformation of the skull. Proceedings American Philosophical Society, Vol. XL, 1902.

Enslin. Die Augenveränderungen beim Thurmschaedel. Archiv. f. Ophthalm., Bd. LVIII, 1904.

Patry. Annales d'Oculist, 1905.

Uthoff. Klinische Monatsbl., 1905.

Melzer. Neurologisches Centralblatt, 1908.

Ambiolet. Annales de Oculist, 1905.

Tucker, Lancet, 1904.

Alexander. Ophthalmic Clinic, 1903.

Cohen. Klinische Monatsblätter, 1906.

Hirschberg. Berliner klinische Wochenschrift, 1909.

Gordon. New York Medical Journal, 1911.

ORBITAL DISEASES SECONDARY TO SINUSITIS.

WENDELL REBER, M. D.,

PHILADELPHIA.

If there is one subject in ophthalmic science that has loomed up larger than any other in the past decade, it is the relation borne by ocular diseases to those of the accessory sinuses. It is true that there are those who still doubt the intimacy and frequency of this relation. However, one cannot but question whether these doubting Thomases have sought for the true etiology in seemingly obscure ocular conditions. Those who admit they occasionally see such cases but are still undecided as to the importance of the relation, should consult the monographs of Onodi, Birch-Hirschfeld, and Loeb. The tireless industry of these investigators compels admiration. Birch-Hirschfeld collates a literature embracing 721 titles in his colossal work (*Græfe-Sacmische Handbuch*, second edition) on the relation of ocular and sinus diseases. All of these 721 papers relate principally to the more apparent frank cases with manifest signs of ocular disease and inflammation. Little note, however, is made in general ophthalmic literature of the countless hundreds of minor ocular disturbances due to temporary sinus conditions (serous sinusitis) that are relieved by farseeing thorough workers in ophthalmic and rhinologic science. Indeed it is the writer's belief that we are on the threshold of surprising developments that will follow upon systematic daily study of this relation.

It is no longer necessary to offer evidence in support of the existence of the relation. What is now needed is demonstration of the paths by which infective or irritative material gains access from the sinus to the orbit, and to the globe itself and its appendages.

To this end it is important to consider the anatomy of the parts.

Entrance to the orbit may be gained: 1. By direct continuity (anatomic). 2. By way of the venous circulation. 3. By way of the lymphatics

1. As to direct continuity, we know that dehiscences (holes or defects in the bony walls of the orbit) are frequently the portals of entry of infective material and have an important bearing on the spread of a disease process from the sinuses. Such defects in the bone may be congenital or due to senile atrophy. Moreover, by reason of their presence the mucosa of the sinuses may come into contact with the orbital periosteum. A survey of the literature would seem to indicate that these dehiscences are most frequent in the os planum or lamina papyracea of the ethmoid bone on the inner wall of the orbit. This is rather to be expected as the wall of the orbit at this point is extremely thin even in most normal specimens, and defects in so thin a bony wall seem quite natural. Dehiscences in the wall of the optic canal and of the sphenoidal and posterior ethmoidal cells may bring the mucous membrane lining the sinuses into touch with the sheath of the optic nerve. In like manner the mucosa of the frontal and maxillary sinuses may come into dangerous relation with the periosteum of the orbit. Indeed, except in its temporal aspect, the orbit is easily subject to invasion in all its extent by direct continuity from any of the sinuses except the sphenoid, and the last named sinus may jeopardize the optic nerve. H. W. Loeb (*Annals of Otology, Rhinology and Laryngology*, June, 1909) studied the relation of the optic nerve to the sinuses and found the optic chiasm usually in close relation with one or more of the sphenoid sinuses. On the average more than half of the optic nerve was included in what is termed its "sinus portion." As a rule the posterior ethmoid cells approach the nerve rather closely. This is somewhat against Onodi's claim, that the posterior ethmoidal cells are more often in relation with the optic nerve than the sphenoid sinuses.

2. Transmission by way of the venous circulation. Walter was the first to describe the orbital veins in 1778. Since that time Sesemann, Merkel, Gurwitsch, Festal, Krauss, Kuhnt, and others have amplified our knowledge touching this subject so that today the relations are pretty well fixed. According to Gurwitsch, the superior ophthalmic vein is the chief venous channel of the orbit. It is interesting to note that it has no valves. He states that the following veins empty into it:

1. The vein from the lacrimal sac.
2. A vein from the frontal sinus.
3. A vein from the venous plexus in the antrum.

4. A communicating branch from the inferior ophthalmic vein.

5. An anastomosing branch with the angular vein.

6. The anterior and posterior ethmoidal veins.

7. The muscular veins.

8. The lacrimal vein (from the gland).

9. The *venæ vorticosæ*.

10. The central retinal vein.

11. Veins from the venous plexus of the optic nerve sheath.

12. Small branches from the orbital fat.

It is therefore to be remembered that five veins from the nasal mucosa communicate with the superior ophthalmic vein and that arching branches across the root of the nose connect the venous system of one orbit with that of another; furthermore, that branches from the orbicularis and the lacrimonasal duct communicate directly with the orbital veins. These facts were ascertained by the study of injection preparations. Four years ago Krauss substantiated these findings with the aid of radiography. (*Bericht d. 31 Vers. d. Ophthal. Gesellsch. zu Heidelberg, 1907*). As Onodi says, "The orbital veins are thus in communication with the veins of the face, of the nasal cavity and the pterygoid plexus. They empty themselves posteriorly into the cavernous sinus. Sometimes the central vein of the retina opens directly into the cavernous sinus, but it may also pass into the pterygoid plexus. The inferior ophthalmic vein may also communicate with the latter plexus. With so complex a system of anastomoses, diseases of the accessory sinuses when affecting a vein may readily spread to neighboring parts." Krauss' investigations, as also those of Birch-Hirschfeld, show that the blood from the eye and orbit has a very free passage either forward or backwards because of the almost complete absence of valves in the veins; that the anastomosis with the facial veins is generally the larger. The amount of blood making use of these channels probably depends largely upon the position of the head at the time.

3. As to the presence of lymphatic spaces and a lymph current in the orbital tissue, there is still some doubt. The recent researches of Birch-Hirschfeld, however, show plainly the presence of lymph spaces in the orbital tissues of rabbits, dogs and apes, and the evidence furnished by pathologic human specimens lends the strongest presumptive evidence to his con-

tention that such spaces exist in the normal human orbital tissues. It is altogether probable that when this phase of the subject has been entirely worked out it will be found that there is communication between the lymphatics of the orbit and those of the nose and the sinuses. At the present writing there are but few observations, both microscopic and bacteriologic, which point to the source and spread of the infection by continuity or otherwise (blood vessels and lymphatics). What is needed is a postmortem examination of the manner and course of the spread of the disease; also microscopic and bacteriologic investigation of the diseased sinuses and of the optic nerves. There are also lacking postmortem findings on the state of the ethmoidal veins, the central vein of the retina, the vena vorticiosa, the venous radicles arising from the diseased sinuses, the state of the lymphatics; and, as Onodi says, "a more exact description of the relation of the optic nerves to the diseased and healthy sinuses." This last statement has tremendous significance, coming as it does from Onodi, who has done more original work in this particular direction than any other investigator.

Statistics.—As to the frequency of the relation which is the subject of this paper, no tabulations have been offered since the publication of Birch-Hirschfeld's well known figures showing that out of 684 cases of orbital disease, 409 (or 60 per cent) were due to inflammation of the neighboring sinuses. This author, in commenting on these figures, well says that this is simply the *known* percentage, and that if the actual facts could have been gotten at in the remaining 40 per cent, it is his conviction that a much larger etiologic factor than 60 per cent could have been proven.

The orbital diseases secondary to sinusitis may be classed as extra- and intraocular. The extraocular conditions only will be considered at this time. Of these we may mention the following:

1. Orbital periostitis.
2. Subperiosteal abscess.
3. Orbital edema.
4. Orbital cellulitis.
5. Orbital abscess.
6. Mucocoele of the frontal or ethmoidal sinuses.
7. Pareses and palsies of the ocular muscles.
8. Optic nerve disorders.

Orbital periostitis, which is generally put down in most text books as due to syphilis or tuberculosis, is now known to be most frequently due to some sinus disease manifest or latent. It is altogether likely that many cases reported in the past as being specific or tubercular were in fact secondary to purulent sinus disease. The same may be said as to subperiosteal abscess. Periostitis and osteitis, leading to caries and necrosis with perforations, sometimes follow. In such a sequence the neighboring soft tissues may be attacked.

Edema of the orbital tissues may be of two kinds: (a) that due to obstruction to the venous circulation, (b) inflammatory edema. The first type is illustrated by the following case history:

H. W., aged 32, consulted me in 1901 for correction of a refractive error. He proved to be an astigmatic myope and was made perfectly comfortable with a new correction. Six months later he returned, saying he had suddenly developed violent supraorbital neuralgia, with complete loss of reading power. Both eyes were suffused, the conjunctiva edematous and ocular rotations painful. The interpalpebral fissures were 2 to 3 mm. wider than usual and both eyes seemed slightly proptosed. He had just recovered from an influenzal attack, but his physician reported lungs, heart, circulation and kidneys normal. He was referred to a rhinologist, who diagnosed nasal polypi with sinus obstruction. Treatment of the nasal abnormality dissipated his symptoms in thirty-six hours, and in three days his accommodative power was normal for his age.

It is a nice question whether some cases published as instances of episcleritis periodica fugax are not really orbital edemas secondary to nasal disease. Indeed the brother of the patient whose case history has just been recited has consulted me three different times, presenting a clinical picture that might easily be diagnosed as episcleritis periodica fugax, and each time nasal treatment has relieved the ocular condition.

Sometimes the orbital edema is limited to one eye, as in the following instance:

G. S., aged 35, female, occupying an administrative position, was refracted by me in 1908. (Fig. 1.) For a year she was perfectly comfortable in the use of her eyes, when more or less suddenly the left eye began to be uncomfortable after near

work. Almost every morning there was conjunctival chemosis of that eye, much more marked over the temporal aspect. The Hertel ophthalmometer showed a proptosis of 4 mm. in the left eye, and the interpalpebral fissure was 2 mm. wider on that side. Rhinologic examination revealed nasal obstruction on the left side, and treatment relieved the patient within one week, not only of her ocular distress but also of her beginning unilateral exophthalmus. It is the writer's belief that unilateral exophthalmus, in the absence of other signs of hyperthyroidism, is almost invariably symptomatic of orbital edema and some manner of obstructive sinus disease.



Figure 1.

Mucocoele.—This form of orbital disease has long been known, originating generally in either the frontal sinus or the ethmoidal cells. The history is generally one of quiet appearance of a soft compressible tumor in the inner, or upper and inner aspect of the orbit. Usually the nasal examination reveals long standing changes in the mucosa with polypoid formation, although at times no visual nasal change is present as in the following instance:

During the time I was associated with the German Hospital, Mrs. C. E. L. was admitted to my service in the ophthalmic

out-patient department. The history was that one month previously there had appeared at the upper inner aspect of her right orbit a small compressible tumor about half an inch in diameter. It increased in size very slowly until when I first saw her it was about an inch in diameter. The patient was 30 years of age, rather undersized but in splendid physical condition. The eyeball was displaced down and outward about 6 mm. as compared with its fellow. There had been no pain nor inflammatory symptoms. There was no history of repeated or heavy colds or influenza. The eyeball was normal in all respects exteriorly and interiorly, and the motility of the eye unimpaired in all meridians. She was referred to Dr. Barton Potts, who, after a searching examination, reported he could find nothing wrong in her upper respiratory tract. She stated that six years previously she had had an almost identical condition which had lasted almost two months and disappeared spontaneously over night. This accounted for her seeming indifference to her condition. She was placed on increasing doses of atropia to its physiologic effect, and for local use in the nasal passages she was ordered a spray of antipyrin, cocain and solution of adrenalin 1:3000, to be used five or six times a day. At the end of ten days she returned with her right eye in normal position and complete disappearance of the mucocele. She stated that the previous night just after retiring she felt a gush of some thick fluid in her throat and on arising to spit it out found it was thick and jelly-like with a little pus in it.

This case was particularly interesting to me as illustrating how obstructive disease in the sinuses may elude the most searching rhinologic examination and yet yield to therapy directed to the suspected condition.

Orbital cellulitis when not traumatic is most frequently due to the extension of sinusitis. It is the chief inflammatory sign of extension of suppurative disease in the frontal and ethmoidal sinuses. Its clinical symptoms (proptosis, high grade conjunctival edema, pain on moving the eyes or trying by pressure to reduce the exophthalmos, also aggravation of the symptoms after lying down) are too well known to need further description. Unless promptly treated it often goes on to orbital abscess with increase of all the above symptoms plus spontaneous pain and neuralgia, marked febrile movement, general malaise and

sometimes even prostration. The following case history is in point:

A. S., colored, female, aged 50, seen February 20, 1910, in consultation with Dr. Arthur Boyer, who stated that three weeks previously she had low grade orbital cellulitis in the left eye that had responded very promptly to local ocular and nasal combined with general treatment. After six or eight days following exposure to cold there was sudden lighting up of all her former symptoms with classic signs of orbital abscess. The conditions at the time I saw her are well illustrated in the photograph. The proptosis equalled 10 mm. and the globe was practically immobile. At two points in the frightfully chemotic conjunctiva there were signs of pointing, and I therefore counselled supportive conservative treatment for twenty-four hours, the more so as the patient was much enfeebled. The following day there was spontaneous free evacuation of considerable pus from both openings in the conjunctiva, and the ocular conditions were normal within a fortnight. She was the subject of purulent ethmoidal disease. Four years ago I presented the history of an almost identical case to this society at its meeting at Reading, Pennsylvania.

Orbital abscess or disease of the mucous membrane covering the veins may be the cause of a thrombophlebitis in the central retinal vein, in the superior ophthalmic vein, or in the plexus of veins at the apex of the orbit. The following was probably a case of this kind:

N. L., 15-year-old girl, seen by Dr. Geo. Carr, October 20, 1910, complaining of difficulty in breathing through the right nostril. Examination revealed a large septal spur and a very large polypus in the right naris and a tremendously hypertrophied turbinate in the left naris. At the same time she presented suffusion of the right conjunctiva, but no other ocular abnormality. Treatment was directed first to the conjunctival condition, which promptly cleared up. The polyp was then removed, also the septal spur. Considerable mucous discharge persisted up to December 1, 1910, when the right eye became congested again but cleared rapidly under a boric acid collyrium. At this time she was refracted and showed a low compound hypermetropic astigmatism with full vision in each eye. But soon the eye congested again and in a few days high grade edema and infiltration of the right upper lid developed.

Ice compresses, atropin, leeches, were of no avail. Quite a little spontaneous pain in the eye, aggravated by pressure, developed at this time. It was at this stage that Dr. Carr asked me to see the case. I found the right naris with quite a fair breathing space below with the septum heavily deviated to the right. The left naris was quite roomy. Both lids of the right eye were greatly swollen, indurated and agglutinated. Half an hour's soaking of the lids with hot soda bicarbonate solution was required before the lids could be completely separated, when the conjunctiva was found to be deeply congested and somewhat chemotic, the whole expanse of the cornea reduced in lustre and a small corneal ulcer 2 mm. from the outer lower limbus. Fluorescein revealed a very fine superficial punctate keratitis in a 3 mm. zone about the ulcer. The motility of the eye was perfect in all meridians. The pupil was $5\frac{1}{2}$ mm. in diameter and regularly round (atropin), and there were no synechia in evidence. The left eye was normal in all aspects. The haziness in the cornea made the ophthalmoscopic examination of the right eye rather difficult, but no gross lesions of any character could be made out, other than that the veins were broad and tortuous. The vision equalled $5/22$ uncorrected, and $5/15$ with her glass. Dr. Hitschler also saw the case and we agreed in recommending submucous resection with further exploration of the nasal cavities when the nasal mucosa could be gotten sufficiently quiet. Six months later Dr. Carr wrote me that the patient had passed from his observation but that when he last saw her she was much better. It is my belief that in this case there was invasion of the orbit by the nasal disease and that a thrombophlebitis of the superior ophthalmic vein was induced by the orbital disease. This would account for all of the symptoms in this case. If the venous circulation becomes reestablished later through collateral anastomoses, the ocular signs will largely disappear.

Treatment.—The question as to whether the treatment of orbital phlegmon should be surgical or nonsurgical is sometimes a nice one to decide. Birch-Hirschfeld collates the results in 98 operated cases and 50 nonoperated cases, as follows:

In the 98 operated cases, 35 secured good vision, 17 had much reduced vision, 29 became blind in the affected eye, and 17 died.

In the 50 nonoperated cases, 12 secured good vision, 8 re-

duced vision, 14 became blind in the affected eye, and 16 died.

This shows 17 per cent of deaths in the operated cases and 32 per cent of deaths in the nonoperated, so that from these rather extensive figures the argument would seem to be for surgical interference in high grade orbital cellulitis and abscess.

Ocular Palsies and Pareses.—That these conditions are at times due to the extension of sinusitis to the orbit is now a well accepted clinical fact. In the case of the superior oblique, there need be no extension of the suppurative process from the frontal sinus to the orbit. The eroding effect of the pus finally exposes the pulley of the superior oblique, and the pressure of the confined secretion will then sufficiently hamper the action of the pulley to produce either a paresis or palsy of the muscle. Many obscure cases of superior oblique involvement are of such etiology, though suspicion is not often enough directed to the frontal sinus in these cases. Palsy of different muscles attributed to sinus conditions invading the orbit have been reported by Savineau, Peyser, Bielchowski, Galezowski, Posey and many others.

Retrobullbar Neuritis.—Nothing has been more interesting in the domain of ophthalmic science than the evolution in our ideas concerning the etiology of retrobulbar neuritis.

Among the fathers it was held, along with neuritis of the head of the nerve, to be most frequently syphilitic. Then came rheumatism, exposure to cold (at which point they came fairly close to the more exact viewpoint of today), the various dyscrasias, all the toxemias and most recently the autotoxemias. All of these causes are at times operative; but within recent years so many cases and series of cases have been recorded in which the sinuses were the starting point of the disease that we are obliged to admit this cause as one of the prominent ones. Particularly is this true if the retrobulbar affection be unilateral. It is also true, as Onodi observes, that cases are on record in which the unfavorable progress of a retrobulbar disturbance or papillitis was not in the slightest degree influenced by operation on the diseased sinuses; and on the other hand, cases of frank suppurative sinusitis in which operation was refused and spontaneous cure of the optic neuritis occurred are on record. It is thus seen that suppurative sinusitis may be present in such cases and be

seemingly in causal relation and yet be independent and not associated with the nerve disorder.

Inflammatory diseases of the sinuses and orbit may spread directly to the nerve; also pressure on that portion of the nerve that is free of blood vessels, as well as pressure on its nutrient vessels, may lead to visual disturbances and to blindness. Similarly disease of the sinuses contiguous to the nerve may extend through the optic canal to the sheath of the optic nerve.

Direct infection through the bony wall must be by osteitis and periostitis; it may also occur by venous thrombosis. Onodi feels that the sphenoid sinus is not so often at fault as the posterior ethmoidal cells, while Hajek throws some confusion into this claim by asserting that it is frequently impossible to differentiate the posterior ethmoidal cells from any of the other ethmoidal cells. All of which goes to show that we are still in need of the most exact study of the anatomic relations of these sinuses to the optic nerve. The clinical fact stands, however, that retrobulbar neuritis is often due to infection or irritation from the toxic substances contained either in the sphenoid or ethmoid sinuses, and that they occupy an important etiologic relation to them.

To summarize what has been said: All manner of extra- and intraocular diseases are today traceable to suppurative and nonsuppurative diseases of the accessory sinuses. Ofttimes it will require the most prolonged study on the part of the rhinologist to finally establish the relation. In ocular conditions of seemingly obscure origin, no case can be said to have been properly studied until the accessory sinuses have been shown to be plainly noncausative; and not infrequently we shall be obliged to direct treatment to the suspected sinuses in spite of the negative report of the rhinologist when the ocular signs justify it.

1212 Spruce Street.

REPORT OF A CASE OF SYMPATHETIC OPHTHALMIA.

NELSON M. BLACK, M. D.,

MILWAUKEE.

Daniel D., boiler maker, aged 30, while holding galvanized iron rivets in putting in head of boiler, was struck in O. S. with what he thought was galvanized iron scale from rivet at 9 a. m., March 25, 1909. Saw Dr. Kietch of Racine within one-half hour, who gave atropin and said sight was lost. Had a great deal of pain. Was seen by me next day at noon.

Examination.—Oblique cut of cornea in lower outer quadrant, not involving ciliary region, extending from up and out, to down and in; pupil partially dilated, iris adherent to wound, but little blood in anterior chamber which was fairly deep; lens injured, beginning traumatic cataract. Vision, O. D. = 6/12; O. S., = hand movement. No fundus reflex obtainable. Victor giant magnet attracted foreign body and brought same up against iris and ciliary body on the flat, but could not extract same. An iridectomy downwards was made and a piece of steel evidently from the hammer used, 9x2x1 mm., was easily extracted through the incision by rotating the eye strongly upwards, and applying the magnet tip to the lip of the wound.

Treatment.—Cold compresses, atropin, argyrol and dionin for next forty-eight hours. There was considerable hyphemia but no sign of infection, and the wound healed nicely. Treatment after forty-eight hours changed to hot compresses one-half hour q. h. 3, atropin, argyrol and dionin.

March 31st, hyphemia gone but considerable exudate in anterior chamber.

April 6th, eye quiet, iris not attached, well dilated, exudate absorbing and traumatic cataract well developed.

April 7th, sent to home hospital to continue hot compresses, atropin and dionin.

April 12th, eye quiet and clearing up; continue same treatment.

April 24th, eye quiet, advised to stop atropin and dionin and commence work.

May 3rd, has been working one week. O. D. considerable lacrimation; vision $6/12$; add $-.50 + .75$, $90^\circ = 6/7\frac{1}{2}$.

May 15th, complains of pain, photophobia and lacrimation in O. D. Has noticed no loss of vision; eye red and congested with circumcorneal injection. Globe is soft and tender to touch. Says: "O. D. feels worse than O. S.," which is deeply injected and beginning to contract. Vision O. D. = $+6/12$. Sent to hospital. Hot compresses one-half hour q. h. 3., atropin. Dionin locally and 1 gm. sodii salicylate q. h. 3. day and night.

May 17th, enucleated O. S., which was much contracted and very soft; continued same treatment; pupil O. D. partially dilated; two synechiæ down and out.

May 24th, O. D. very much injected with pronounced circumcorneal injection; pupil fully dilated; synechiæ broken loose; eye soft and still tender; pain at night. Vitreous hazy, but no appreciable opacities; disk very hyperemic, and swollen about $1\frac{1}{2}$ diopters; vessels very much engorged; same treatment.

May 24th, stop salicylate; give asperin, 1 gm. q. h. 3.; local treatment same.

May 27th, mercurial inunctions followed by pilocarpin sweats.

June 17th, has had seven sweats followed by potassium iodide in large doses. Vision, $6/60$; fundus still hazy and disk still swollen about one diopter.

June 22nd, vision, $+1.75 \odot +1.75$, $90^\circ = 6/15$.

June 29th, increased dose of iodids daily and gave sodii salicylate 1.25 gm. b. i. d.

July 3rd, vision, $+.75 \odot +1.75 = +6/12$. Vitreous much clearer, disk margin seen except above and below. Return home, stop all treatment except iodids.

July 7th, vision, $+.75$, $90^\circ = 6/12$; continue same treatment.

July 14th, vision $6/12$, no improvement with lenses. Media clear, disk clear. Fitted artificial eye. Commenced work.

Summary.—Injured March 25, 1909, steel removed next day through iridectomy wound with giant magnet, no involvement of ciliary region except trauma of piece of steel being brought up against ciliary body by magnet in attempting to extract same. Eye quiet, commenced work April 26, 1909.

May 15th, 1909, first symptoms of sympathetic ophthalmia, pain, photophobia, and lacrimation of injured eye. Vision reduced from 6/7½ with correction to — 6/60. O. S. enucleated May 17, 1909, was very soft with beginning phthisis bulbi. Two synechiæ in O. D. quickly broken up under atropin and dionin. Vitreous was somewhat cloudy but no large opacities. Disk very hyperemic and swollen about 1½ D. Treatment locally: hot compresses, atropin and dionin. General: sodii salicylate, asperin, pilocarpin sweats, mercurial inunctions and iodids.

July 14th, 1909, vision 6/12. No improvement with lenses, media clear, disk clear, no swelling; returned to work.

120 Wisconsin Street.

A FATAL CASE OF STREPTOCOCCIC BACTEREMIA WITH PANOPHTHALMITIS.*

HOWARD F. HANSELL, M. D.,

PHILADELPHIA.

In April, 1911, a male patient, an iron worker, aged 46, was admitted to the medical ward of the Philadelphia General Hospital suffering with inflammation of knees and ankles of both legs of two days' duration. In twenty-four hours the right eye became injected, he complained of failing vision, and I was requested to see him.

He had had the usual diseases of childhood and had recovered from them without sequelæ. At the age of 36 he had specific urethritis, but denied syphilitic infection. He had used alcoholic liquors to excess during the past twenty years, and during the last two years has had several attacks of mania potu. During this time he has frequently suffered with rheumatic pains in the larger joints of the extremities, and this was his principal complaint upon admission. The joints were swollen, red and painful.

The inflammation of the eye appeared to commence in the iris. The membrane rapidly thickened and exuded a filmy opaque material into the anterior chamber and pupil. The membrane of Descemet was covered with grayish deposit, and the cornea propria was infiltrated and opaque. The injection of the conjunctiva and cornea rapidly increased, tension became high and the eyeball sensitive to the touch. The eye became entirely blind and almost immobile. All the signs of a violent purulent panophthalmitis were present. The left eye remained unaffected. Pus obtained by puncture of the prepatellar bursa revealed myriads of streptococci. Blood culture also showed streptococci. The patient's condition became progressively worse and he succumbed at the end of the third day.

Postmortem examination showed chronic interstitial nephritis, small and hard liver, chronic mitral valvulitis and aortitis, engorged vessels of the dura mater and pia mater, and strep-

*Read before the Section on Ophthalmology, College of Physicians of Philadelphia, December 21, 1911.

tococci in the culture media made from clots removed from the anterior cerebral vessels.

Macroscopic examination of the eye: anterior and vitreous chambers filled with purulent material, distended and tortuous vessels in the sheath of the optic nerve, especially in a focus about one-half inch from the globe. Microscopic examination: diminution of the number of axes cylinders in the optic nerve, disintegration of the white substance of Schwan; choroidal vessels engorged, and some of them blocked and small round cell infiltration between the blood vessels. No streptococci could be found.

Under the name "*Kryptogentische Septikopyaemia*," Groenouw (Graefe and Saemisch, second edition, page 504) describes an affection of the eyes analogous to that detailed above; sepsis attended with fever and purulent metastases. The disease often presents in the beginning, symptoms common to different infections, and is probably often mistaken for them. It is not always possible to find a localized source of pus, and in such cases one must assume that the bacteria have entered the body through a mucous membrane without having excited evident inflammation. To the cryptogenetic pyemias belong the cases of ulcerative endocarditis and some of those which appear to be acute rheumatism of the large joints, and finally those which appear to resemble typhus, meningitis or miliary tuberculosis. He mentions 30 cases, of an average age of 30 years. The ophthalmia appeared from the first to the eighteenth day of the general infection and terminated in about seven days. Panophthalmitis developed in 13 cases of ocular involvement, and in 6 one eye became atrophied from nonpurulent inflammation. Twenty-seven cases were binocular, of whom 83 per cent died; 15 cases were monocular with fatal termination in 33 per cent. Endocarditis was very common. The most frequent bacteria were the staphylococci, next in frequency the streptococci, and third the pneumococci.

Axenfeld states that metastatic ophthalmia is due primarily to the introduction of septic masses into the capillary vessels of the eye. In the binocular form the first tissue to be infected is the retina; in the monocular, the uvea. Micrococci are found at some time in the course of the disease in the blood, a statement confirmed by the above case and by one described by A. H. Pagenstecher (*Deutsch. klin. Med.*, Bd. 86, 1906) of

purulent meningitis with metastasis. Eleven days before death the patient had double panophthalmitis. Streptococci were found during life within the blood and in the spinal fluid. M. Jocqs (*Rcc. d'Ophthal.*, July, 1907) reports two cases of membranous conjunctivitis, in one of which the streptococci were found in the discharge. The patient had recently recovered from scarlatina. A lacrimal abscess and lacrimal fistula and the affection of the conjunctiva had followed the fever. Three injections of serum were made but the eye was lost. He recommends the antidiphtheritic serum as equally or more valuable than the serum made from streptococci.

de Schweinitz (*Annals of Ophthal.*, January, 1907) reports a case of bilateral metastatic ophthalmitis in puerperal pyemia with recovery of the patient but the loss of both eyes. Each eye became intensely injected, the entire corneæ grayish white, and between the center and the periphery an annular purulent infiltration or ring abscess. Examination of the purulent secretion from the conjunctiva showed great quantities of streptococcus pyogenes. The focus of the infection was an abrasion of the uterine mucous membrane. J. H. Parsons (*Bristol Medical and Clinic Journal*, Vol. XXVII) records an instance of metastatic panophthalmitis with abundance of streptococci from purulent ear disease. The same author in his work on pathology says the microscopic appearances are those of exogenous purulent retinitis; the infiltration is most marked at the ora serrata and near the disk. The anterior part is first attacked and that by continuity from the ciliary body. The vessels show thickening and cellular infiltration, hyaline degeneration of the media, desquamation of the endothelium, hyaline thrombosis and hemorrhages.

Collins and Mayou (*Pyles' System of Ophthalmic Practice*) say that in endogenous or metastatic infection, the organisms are brought by the blood stream from some focus of disease elsewhere in the body and deposited in the eye.

The virulence of streptococci varies. They may produce the most acute and fatal infection or a surprisingly trivial lesion. The affections of the eye in which they are present are impetigo, mucopurulent conjunctivitis, small gray ulcers of the cornea which may end in sloughing of the entire cornea, uveitis which always leads to panophthalmitis, lacrimal abscess, and purulent orbital cellulitis.

1528 Walnut Street.

TRANSITORY DECREASE IN THE STATIC REFRACTION OF THE EYE IN DIABETES.*

WILLIAM ZENTMAYER, M. D.,

PHILADELPHIA.

Much interest attaches to changes in the refraction of the eye in diabetes, especially as there may result either an increase or a decrease in the static refraction. The difficulty of reconciling these observations has appeared so great to some that one writer has not hesitated to impugn the accuracy of the work of his colleagues, especially as the observations conflict with his view as to the possible effect of the disease upon the dioptric system.

The theories which have been advanced to explain the decrease in the refraction are: 1. Paresis of accommodation whereby latent hyperopia becomes manifest. 2. Dehydration of the vitreous. 3. A change in the index of refraction of the vitreous. 4. A change in the index of refraction of the aqueous. 5. A change in the index of refraction of the lens. 6. An alteration in the curvature of the cornea.

Three conditions are known to occur in diabetes which have a bearing upon these theories, namely, paresis of accommodation, transitory myopia which occasionally occurs, and cataract. The occurrence of the first would render manifest part or a whole of a latent hyperopia. If the previous static refraction of an eye developing hyperopia in the course of diabetes had been unknown, it would lend plausibility to this theory, but in some of the cases (Carpenter's and Risley's, for examples) it was known, and in one (Lundsgaard) it was carefully estimated under atropin cycloplegia after the attack had passed off. Again, in some of the cases the amplitude of accommodation was found normal. Paresis of accommodation in other conditions, as in diphtheria, is not so fugacious. The other refractive change which occurs in diabetes cannot be explained

*Read before the Section on Ophthalmology, College of Physicians of Philadelphia, December 16, 1910.

on this hypothesis, and all writers are agreed that it is probably due to a swelling of the lens.

Groenouw reports the development of hyperopia with astigmatism in which the keratometer showed absence of corneal astigmatism. Van der Hoef brought forward the theory that the diminished refractive condition is due to an increase in the index of refraction of the cortical layers of the lens whereby a more uniform index is acquired by the whole lens and a consequent reduction in the total refractive power. Grimsdale also advances the same theory. In support of this view, Randall calls attention to the fact that the nearly spherical lens of the infant is not excessively refracting for its short eye because homogeneous, and that a reduction in the refraction would result from any increase in the index of the cortical layers of the lens.

Landolt attributes the change to an alteration in the index of refraction of the vitreous; and Horner, who reported the first instance, was inclined to the view that it was due to loss of fluidity of the vitreous.

Gould excludes almost all cases of reputed increase of hyperopia on the ground of erroneous diagnosis due to failure to estimate correctly the static refraction. He believes that uncorrected errors of refraction play a part in the production of glycosuria. Pyle agrees with Gould that in most reported cases there was a paresis of accommodation allowing a hitherto latent hyperopia to become manifest.

In Lundsgaard's case and in my own there was no involvement of the ciliary muscle, and moreover, at the age of 58 the amplitude of accommodation is only 1 D., whereas the acquired hyperopia equalled 2 D. with an acquired astigmatism of 0.50 D. in one eye and 0.25 D. in the other. Lundsgaard's last case, in which manifest hyperopia equalled 1.5 D. in O. D. and 2 D. in O. S., was carefully studied in the light of the various theories that have been advanced. The presence of but 0.50 D. of hyperopia under atropin cycloplegia after the symptoms had disappeared, showed that the hyperopia was not manifested latent hyperopia. Repeated testing with the Schiötz tonometer showed that it was independent of any change in the intraocular tension and therefore not due to dehydration of the vitreous. A series of measurements of the corneal curvature excluded an alteration in this as a cause. He concludes that the cause lies in the lens.

My own case is as follows: Mrs. P. was sent to me October 4, 1909, by Dr. M. H. Fussell with a note in which he stated that the patient had been under treatment for glysocuria for three weeks and that on diet alone the sugar had lessened until two days previously there was not even a trace. There had been rapid painless loss of vision for ten days, so that at present she sees better at a distance with her reading glasses than with the naked eye. She is 58 years of age and has worn glasses for six years for near-work only.

Vision O. D., = 6/60; O. S., = 6/60. Irides prompt to light and convergence. Tension of O. S. + (?), slight follicular conjunctivitis. The media were clear. There was a very marked degree of arteriosclerosis, but the changes were confined to the vessels. In O. S. there were two tufts of retained nerve sheath.

O. D. + 2.50 \odot + 0.25 c., ax. 165° = 5/15.

O. S. + 2.50 \odot + 0.50 c., ax. 15° = 5/5. + 2.50 added type 0.33 D. pp. 25 cm.

The following day the cylinder was rejected but vision was the same.

October 26, 1909, there was no change in refraction, vision or fundus.

November 8, 1909, O. D., 1.25 = 6/5 pt.; O. S., 1.25 = 6/5 pt.; accommodation unchanged.

January 17, 1910, O. D., 0.50 = 6/5 pt.; O. S., 0.75 = 6/5 pt. 2.50 added T. O. 33 D. pp. 25 cm.

Lenses clear. The visual fields showed no marked departure from normal.

As has been noted in several of the reported cases, the failure in vision was coincident with a lessening of the percentage of sugar in the urine. Although at one time during the persistence of the change in the refraction there was a return of sugar to the urine, there was no alteration in the amount of the acquired hyperopia.

While my case has not been carefully enough studied to be used as evidence for or against all of the theories that have been advanced, it pretty definitely excludes as a cause latent hyperopia becoming manifest. The presence of a transitory astigmatism against the rule is in favor of a lenticular change.

1819 Spruce Street.

OPTIC NEURITIS FOLLOWING MEASLES.*

J. MILTON GRISCOM, M. D.,

PHILADELPHIA.

Optic neuritis following measles has occupied the attention of comparatively few observers since von Graefe¹ first reported a case in 1866. In view of the small number of cases to be found in the literature, and the interesting features attached to this condition, it may be of value to place on record the details of an additional case, a brief mention of which has already been made elsewhere.²

The patient, Ella B., aged 11, of Gloucester, N. J., came to the Wills Hospital May 21, 1909, under the service of Dr. S. Lewis Ziegler, presenting the following history: Three weeks previously she was attacked with measles which ran a mild course, lasting about two weeks. At no time during the acute illness were there any complications and the patient made an uneventful and apparently complete recovery. One week later, while playing in the yard, the child suddenly discovered that she was blind in her right eye. There was no evidence of inflammation about the eye and she complained only of the loss of vision. The following day she had a severe pain in the blind eye which lasted about an hour and then entirely disappeared. Four days after the right eye had failed, on awakening in the morning, the patient discovered that the sight of her left eye was dim. The vision became progressively worse throughout the morning, and when brought to the hospital that afternoon the child was unable to walk alone.

Examination showed a well nourished girl, apparently normal in all respects with the exception of her vision. O. D. was totally blind. Ocular movements were full in all directions, and the conjunctiva, cornea, and anterior chamber showed nothing abnormal. The pupil was dilated ad maximum, and the iris did not react to light. All the media were

*Read before the Wills Hospital Ophthalmic Society, December 4, 1911.

clear, disk grayish white, swollen 4 D., margins were obliterated, and the edema extended into the surrounding retina for about 1 d. d. The arteries were small and slightly tortuous, while the veins were engorged and very tortuous. There were no hemorrhages, and the periphery of the fundus was clear. O. S. vision, light perception. Ocular movements were free; the conjunctiva and cornea were normal. The pupil was dilated ad maximum and reacted very sluggishly to light. The media were clear, disk swollen 4 D., grayish white, margins were obliterated, and the edema extended into the neighboring retina. The arteries were small and tortuous, while the veins were engorged and tortuous. There were no hemorrhages and no peripheral lesions. An examination of the urine showed specific gravity 1016, no albumen, no sugar, a heavy cloud of phosphates, and no casts. The ears were normal, and there had been neither headache nor pain, with the exception of the short attack in her right eye noted above. The patient refused to stay in the hospital, and was sent home with directions for a hot pack daily and a prescription of calomel gr. 1/10 every hour.

On May 14, 1909, three days after the first visit, the vision had risen to fingers in each eye. The fundi were unchanged except in O. D., where there were several small yellowish white spots in the macular region. In addition to the calomel and hot packs, the patient was put on thyroid extract gr. j., three times daily, and liq. arsenii et hydrarg. iodid. (Donovan's sol.) minim j., three times daily.

May 26, 1909, two days later, vision equaled fingers at 16 inches with each eye. The papillary edema was markedly reduced and the vessels were nearly normal.

June 2, 1909, vision equaled, O. D. 20/200, O. S. 4/200.

June 11, 1909. There was a marked diminution in vision, O. D. 5/200, O. S. 3/200. The disks were now but slightly swollen and had become decidedly pale.

June 16, 1909, vision equaled, O. D. 10/200, O. S. 3/200.

June 23, 1909, vision equaled O. D. 6/200, O. S. 4/200.

June 30, 1909, vision equaled, O. D. 15/200, O. S. 6/200.

July 14, 1909, vision equaled, O. D. 20/100, O. S. 20/100. The disks in both eyes were very pale, margins clearly defined, vessels normal, marked congestion of the retinae, and a granular pigmentation throughout both fundi. Thyroid extract

and Donovan's solution were stopped, and the patient was put on strychn. nitrate gr. 1/40, twice daily, and negative galvanism three times weekly.

August 6, 1909, vision equaled, O. D. 20/50, O. S. 20/50.

September 11, 1909, vision equaled, O. D. 20/50, O. S. 29/40pt.

October 1, 1909, vision equaled, O. D. 20/20pt., O. S. 20/20pt.

October 15, 1909, vision equaled, O. D. 20/20pt. J. 1, O. S. 20/20pt. J. 1.

December 3, 1909, vision equaled, O. D. 20/20 (?), O. S. 20/20 (?). The disks had lost much of their pallor due to the presence of fine capillaries.

January 21, 1910, vision equaled, O. D. 20/20, O. S. 20/20.

Since the last date the patient has been examined several times with no change in her condition. The vision is normal and the fields show no contraction for either form or color.

Although Galezowski³ stated that he had never seen an amblyopia due to measles, and Foerster⁴ was of the opinion that although cases of measles are very frequently seen, nerve affections seldom accompany them, so that a close connection between the two could not well exist, nevertheless there is but little doubt that the sudden blindness and the ophthalmoscopic changes noted in the above case were the direct sequelæ of the preceding attack of measles.

The writer has been able to find in literature, reports of only twenty-three cases of blindness due to optic nerve lesions following measles, all but three of which come under the head of optic neuritis. In 1866 von Graefe⁵ recorded a case of blindness following measles in a girl eight years old, and described what seemed to be a mild neuroretinitis. The next observation of this condition was made by Nagel⁶ in 1871, who reported three cases, one of which was complicated by cerebral symptoms, but eventually recovered normal visual power through injections of strychnia, while the other two became blind through optic atrophy. Wadsworth,⁷ in 1880, before the American Ophthalmological Society, reported three cases of optic neuritis secondary to measles, all of which showed more or less prominent symptoms of meningitis. The first case terminated in optic atrophy, the second died of meningitis, and the third was complicated by a sixth nerve palsy

from which the patient ultimately recovered with full power of the external recti and no loss of vision. During a severe epidemic of measles from 1881 to 1882, Arago⁸ observed a case of optic neuritis associated with meningitis, and also a case of blindness apparently due to an embolism of the central artery of the retina. Keller,⁹ in 1888, reported a case of suppurative otitis media following measles, which was complicated by optic neuritis six weeks afterward. He considered it an open question as to whether the amblyopia was due to the ear disease or was a sequel of the measles infection. In the same year Stephenson¹⁰ reported a case of double optic neuritis accidentally discovered ten days after the patient had been discharged as cured of an attack of measles. There were no complications and no headache or temperature. The urine was normal and the child seemed perfectly healthy. The case was seen ten months later with a pronounced optic atrophy and vision reduced to fingers at 6 meters.

In a paper presented before the Society of Ophthalmology of Paris, in 1888, Boucher¹¹ related the case of a soldier aged 25 years who became blind during convalescence from an attack of measles. The blindness followed an attack of unconsciousness, which was considered the result of a cerebral lesion. At no time were there any ophthalmoscopic signs except possibly a slight pallor of the disks three months later, although the vision was only 7/200 in the right eye and 3/200 in the left. Because of the preservation of the pupillary reflex, which would eliminate a primary lesion of the optic nerve or retina, the absence of ophthalmoscopic signs, the attack of unconsciousness, and the failure of vision, Boucher expressed the opinion that the amblyopia was due to a vascular lesion affecting the occipital lobes, probably caused by a toxic condition of the blood. In support of this he related a case belonging to Calmeil, in which the patient suffered an attack of convulsive delirium and coma toward the end of an attack of measles, leaving the patient deaf, mute and blind. An autopsy a few years later revealed an atrophic and sclerotic condition of the occipital lobes with secondary degeneration of the optic nerves.

Three cases of optic neuritis following measles were reported by Coggin¹² in 1890. The first case was complicated by a sixth nerve paralysis from which the patient fully recovered

with a vision of 10/200 after treatment by strychnia and the galvanic current. The other two cases had symptoms of a mild meningitis associated in one case with a sixth nerve palsy; both showed a neuroretinitis. Coggin concludes that the ocular symptoms were due to a circumscribed basal meningitis, probably secondary to measles.

The subject of optic neuritis after measles has been taken up by Woods¹³ in a paper published in 1892, in which he reported two cases, both without symptoms of meningitis and both ending in optic atrophy. He discussed the previous reports on this condition and concluded that cases of blindness after measles can be divided into two classes: (1) those showing a marked failure of vision without any ophthalmoscopic signs, and (2) those showing optic neuritis from the beginning. The former are apparently due to a cerebral lesion, probably vascular, with consecutive nerve disease; the latter to basal meningitis and neuritis. In 1897, Panas¹⁴ reported the case of a girl 17 years old, who suffered an attack of bilateral papillitis during convalescence from a mild case of measles, with complete blindness of the right eye and greatly diminished vision of the left. Prothon¹⁵ in 1900, recorded a case of bilateral papillitis following measles. Seven years afterward the patient had concentric narrowing of the visual fields with vision O. D. 1/8 and O. S. 1/3. In 1901, Dufourt¹⁶ reported a case of optic neuritis preceded by a severe attack of measles and followed by white atrophy. A case which terminated in a similar manner was reported by Fage¹⁷ in 1902. The patient had a bilateral optic neuritis without any signs of meningitis or otitis, with negative urinary findings and no fever.

In 1903, Marcel Rollet¹⁸ reported a case of a girl, aged 13 years, who became blind some months after an attack of measles. The pupils were inactive, fully dilated; the media were clear; the fundi presented a yellowish color; the optic disks were of an orange color with imperfectly defined outline; the retinal arteries and veins were much reduced in size; the visual field for white was concentrically contracted to within 10 degrees around the fixation point of the right eye, and to within 15 degrees in the left eye; color vision was abolished. A month later pigment was found at the periphery of the fundus. Rollet believed that the toxins of measles had pro-

duced an acute degeneration of the retinal elements followed by an atrophy of the optic nerve and retina, giving rise to an appearance of the fundus resembling certain forms of pigmentary retinitis. In 1906, de Vaucresson¹⁹ recorded the case of a soldier, 24 years old, who was attacked with a monolateral optic neuritis during his recovery from measles. During the acute illness the patient had complained of an unusual amount of frontal headache, which led the author to attribute the neuritis to a meningitis, although he states that this explanation does not exclude the possibility of a direct toxic infection of the nerve itself. Chevalier²⁰ reported the history of a case of optic neuritis following measles in 1908, in which the vision suddenly became very poor shortly after an attack of measles, and five years later the patient was seen with complete atrophy of both nerves. At the same time that the vision failed there was produced an incomplete hemiplegia of the arm and leg of the right side.

A careful review of the above reports will show that these cases may be divided into three classes: (1) those showing evidences of primary cerebral involvement with secondary optic nerve change, (2) those showing meningitis as the most prominent symptom, with consequent optic neuritis, and (3) those showing optic neuritis without any other local or general symptoms.

In the first group may be placed the cases reported by Nagel, Boucher, and Chevalier. Here the failure of vision came on quickly after the patients had completely recovered from the attack of measles, the pupillary reflex was preserved, the ophthalmoscopic signs were absent until late, there were varying periods of unconsciousness and some form of paralysis. As stated by Boucher, and again by Despagne in the discussion of the former's paper, the primary lesions were in all probability situated in the occipital lobes and were dependent on an altered state of the blood due to the toxins of measles.

The cases reported by Graefe, Nagel, Wadsworth, Arago, Keller, Coggin, and de Vaucresson, may be regarded as belonging to the second group. Either during or shortly after an attack of measles, an optic neuritis associated with meningitis appeared, which resulted in complete or partial atrophy of the nerve. In these cases the optic neuritis was a descending one, and frequently involved not only the optic nerve but other cranial nerves as well. It is a well known fact that middle ear

disease frequently follows measles, and either by this avenue or through an involvement of the nasal accessory sinuses, the occurrence of a general meningitis may be explained.

The cases comprising the third group are those reported by Stephenson, Woods, Panas, Prothon, Dufourt, Fage, Rollet, and the writer. Here the history is simply that of an attack of measles followed by optic neuritis without signs of cerebral involvement, meningitis, otitis media, sinusitis, or nephritis. This is by far the most interesting group, since the other two deal with optic nerve changes in association with other well-defined symptoms. Observers of this condition have been divided in their opinions as to whether the neuritis was caused, (1) by a circumscribed meningitis in the region of the optic nerve, or (2) by the selective action of the toxins of measles on the nerve itself. Woods²¹ asks whether a meningitis can exist of sufficient intensity to cause an optic neuritis and manifest itself in no other way. He says: "In this connection I am granted by my friend, Dr. H. J. Berkley of this city, the privilege of using an observation of his before publication in a coming number of the *Johns Hopkins Bulletin*. In the recent report of a case entitled *Acute Ataxia Following Diarrhea*, he advances the theory of autointoxication from the intestinal canal and subsequent inflammation of the nervous system. He adds: "The strongest support that this hypothesis has is the peculiar neuritis of the chiasma of the optic nerves. In persons who have died of infectious diseases, notably typhoid fever, I have noticed in the meninges around the sides and interior portion of the optic chiasm a rather intense degree of inflammation, with much small-cell proliferation and implication of the vessels, especially the veins. * * * This condition in different degrees was almost constant. * * * causing a positive increase in the nuclei between the fibres of the optic nerve.'" Parsons²² believes that a meningitis is probably responsible for the optic neuritis seen in measles; and Zlocisti,²³ in discussing the ocular affections in the acute exanthemata, and measles in particular, states that in cases where the optic nerve is inflamed, the process is usually due to meningitis, probably tuberculosis. After observing a case of optic neuritis following scarlatina, Leszynsky²⁴ says: "There can be no doubt that localized basal meningitis exists both in an acute and chronic form."

Another group of observers, with probably as much justi-

fication, advance the theory of the direct action of toxins on the nerve tissues together with vascular changes, although Uhthoff²⁵ doubts whether the toxins generated by measles can in themselves cause an optic neuritis. Sourdille²⁶ believes in the toxic origin of many cases of optic neuritis, but admits that such is not the only cause. He concludes that two methods may be concerned in the production of the neuroretinal lesions following infectious diseases: (1) the anatomical elements become impregnated by toxins circulating in the blood, and (2) the lesions are caused by microbic emboli in the central vessels of the retina. Flemming²⁷ states that there is no doubt now that a toxic optic neuritis may occur in measles independent of any other complication, but in all such cases a most careful examination must be made to exclude meningitis. In a very comprehensive paper on Optic Neuritis in the Course of Acute Infectious Diseases, Antonelli²⁸ points out that there exists a definite analogy between the action of known forms of toxic neuritis and those due to infectious diseases. He considers the optic neuritis of measles, apart from those cases caused by a vascular lesion or a frank meningitis, as belonging to the class due to toxins, and concludes that the optic nerve represents an organ anatomically and physiologically predisposed to the attack of poisons of all sorts.

A complete study of this question is not possible because of the absence of any pathological examinations, so that our conclusions are based mainly on clinical observation. A review of the anatomical relationship of the optic nerves and chiasm makes it evident that these structures are exposed in an unusual degree to either infection by bacteria or the action of toxins in the blood or lymph streams. The close approximation of the optic nerves to the accessory sinuses, the facility with which infective organisms may gain entrance by way of the cribriform plate of the ethmoid or through the thin and often perforated bony walls of the sinuses, the loose and folded character of the meninges around the chiasm, and the rich vascular supply all point to the ease with which a local inflammatory process may be established, especially in measles, where the nasal secretions are so rich in infectious material. Moreover, autopsies on cases which are analogous to measles show that such a condition can exist without symptoms referable to a meningitis. Furthermore, the fact that the optic nerve carries within its substance a blood vessel, that it is

constantly bathed in lymph, and that it has been definitely shown to be particularly susceptible to toxins in the circulation, all go to show the ease with which a neuritis may originate from such a cause.

With regard to the case detailed in this paper, it may be said that during the acute period it was an open question as to whether the blindness and the ophthalmoscopic signs were the result of a localized meningitis or were caused by the action of toxins present in the body fluids. The complete and rapid recovery which occurred, together with the preservation of normal vision and fields for more than two years after the attack, indicates that the process was not a true inflammatory one with deposition of a serofibrinous exudate between the nerve fibers and a consequent shrinkage with atrophy, but simply an edematous swelling caused by irritating toxins circulating in the blood and lymph streams.

1925 Chestnut Street.

BIBLIOGRAPHY.

1. Von Graefe. *Archiv. für Ophthal.*, Vol. xii., No. 2, 1866.
2. Griscom. *Annals of Ophthalmology*, April, 1911.
3. Galezowski. *Recueil d'ophtal.*, December, 1888.
4. Foerster. *Bericht der Ophth. Gesellschaft*, 1900. p. 30.
5. Von Graefe. *Loc. cit.*
6. Nagel. *Jahres. des Ophthal.*, 1871, p. 348.
7. Wadsworth. *Trans. Amer. Ophthal. Soc.*, 1880.
8. Arago. *Centralbl. für Prat. Augenheil.*, October, 1882, p. 309.
9. Keller. *Monatsbl. für Ohrenheil.*, 1888, No. 6.
10. Stephenson. *Trans. Oph. Soc. United King.*, Vol. viii., 1888, p. 250.
11. Boucher. *Recueil d'Ophtal.*, December, 1888.
12. Coggin. *Amer. Jour. of Ophthal.*, January, 1890.
13. Woods. *Archiv. of Ophthal.*, Vol. xxi., 1892, p. 95.
14. Panas. *Bull. Soc. Franc. d'Ophtal.*, 1897.
15. Prothon. *These de Lyon*, 1900.
16. Dufourt. *Clin. Ophthal. de Bordeaux*, November, 1901.
17. Fage. *Annales d'Oculist.*, Vol. cxxvii., p. 17.
18. Rollet. *La Clin. Ophtal.*, July 25. 1903.
19. de Vaucresson. *Annales d'Oculist.*, T. cxxv., p. 202, March, 1906.
20. Chevalier. *Clin. Prat. Mal. des Yeux*, Paris. 1908, iv., p. 37.
21. Woods. *Loc. cit.*
22. Parsons. *Pathology of The Eye*. Vol. iv., p. 1323.
23. Zlocisti. *Die Erkrank. des Aug. bei den Akut. Exanthem.*, p. 17.
24. Leszynsky. *N. Y. Med. Record*, April 27, 1889, p. 454.
25. Uhthoff. *Bericht der Ophthal. Gesellschaft*, 1900. p. 30.
26. Sourdille. *Trans. Ophthal. Sect.*, 13th. *Internat. Med. Cong.*, Paris, 1900.
27. Flemming. *Brit. Med. Jour.*, April 29, 1899, p. 1013.
28. Antonelli. *Congress de Madrid*, 1903.

A CASE OF DOUBLE PERFORATION OF THE GLOBE BY AN IRON SLIVER.*

BURTON CHANCE, M. D.,

PHILADELPHIA.

No apology is made for the presentation of another case of double perforation of the globe by a foreign body. There have been but about fifty such cases reported, and the details of this one, therefore, may not be uninteresting.

On July 21, 1911, a healthy young Greek, while chipping in a boiler shop, was struck in his left eye by a piece which he believed came from his tools. The pain which immediately followed the blow soon subsided, but he noticed he could not see with his left eye. He had been near-sighted since childhood.

When seen by me at the Wills Hospital the next day, twenty-three hours after the injury, the upper lid was ecchymotic, the globe slightly injected; while there was a clean perforation at the apex of the cornea and the lens was cataractous. The cornea had not lost its sparkle, nor the iris its mobility, for it had not been injured. The ball was not especially tender, and the tension of the globe was reduced. The man could distinguish shadows only, although the vision of the uninjured eye equaled only 6/100. Suspecting the presence of a foreign body within the globe, I applied strong hand-magnets, inserting the tips through the corneal wound. These failed, however, to attract any metal, neither did the patient complain of pain when the electric contacts were made, yet of the value of this sign we were uncertain because the man could not understand us as he knew no English.

The next day the foreign body was localized by means of the X-ray; the radiogram disclosed that the anterior and posterior walls of the globe had been perforated, and that a body had lodged in the nerve 32 mm. back of the center of

*Presented at the meeting of the Wills Hospital Ophthalmic Society, Wednesday, November 8, 1911. From the service of Dr. Schwenk.

the cornea. In the judgment of Dr. Fisher, who saw the patient in consultation, there was held out the hope that the eye might recover with only the loss of the lens, and that the foreign body might become encysted in the orbit and provoke but little damage.

The symptoms were not pronounced in the next seventy-two hours: the wound was clean, the cornea sparkling, the pupil dilated, and the lens only moderately swollen. After a few days the man complained of pain, and requested me to remove his eye. He had been kept in bed, ice compresses had been applied steadily, atropin solution used, and calomel given. By this time the immediate traumatic reaction had subsided only to be replaced by a condition of dullness, in which there were scanty discharge, stickiness of the eyelids to the globe, the globe darkly injected but not chemotic. The corneal surface had lost its sparkle, though the wound was united. The aqueous was more or less turbid, for the iris had become edematous and could no longer be affected by atropin solutions, the pupil remaining irregular and distinctly contracted.

The lens had not disintegrated in the manner we commonly see in cases of deep injuries of that body. The wound in the capsule had apparently closed, and from it there extended a fibrous film which was attached to the corneal cicatrix.

By this time the ball had become tender and the ocular reflexion was of a singular greenish hue. The patient complained of a continuous yet dull pain on the left side of his head, and he no longer had as sharp nor as extensive light perception; it remained dimly on the temporal side.

It is likely that deeper and more serious trouble was impending when the patient complained of headache. He did not have any rise in temperature, nor was there vomiting. The eyeball by this time showed signs of symptoms produced by injuries more serious than those of traumatic cataract.

I did not suggest the performance of any operation for the removal of the foreign body from the nerve because of the condition of the uvea and because of the fear that the nerve might be further injured by such procedures.

After consultation with Drs. Fisher and Zentmayer, I excised the globe on August 8. In the operation the orbital tissues were found to be dense and adherent to the globe, in the manner so frequently seen in cases of traumatism with

"cold" degeneration of the uveal tract. It was not expected that the foreign body could be easily secured, but by entering the scissors at the nasal angle and as deep into the orbit as possible, the section was made with the result that the nerve was severed exactly at the proximal edge of the foreign body, so that it was undisturbed in its bed within the tissues. It was found loosely beneath the adventitious sheath of the nerve on the upper surface of the stump. No other metallic substance was felt in the orbital tissues.

The hemorrhage was scanty, probably because the patient became quite cyanotic during the etherization. In the next twenty-four hours an intense effusion into the orbit and lids followed. But the patient became so speedily relieved of the pain in his head, of his lassitude and dejection, that he got out of bed on the following day and was quite eager to go home.

The ball was preserved and was sent to the laboratory; the study of it elicited the following details:

A vertical section of the globe and nerve stump was made in the endeavor to include the path of the perforating metal. In the clouded cornea was seen the partly healed wound from which extended a white fibrous cord attached to the perforation in the anterior capsule. The iris and ciliary bodies were saturated with purulent matter, and the iris was firmly attached to the lens by a dense fibrous exudate which completely occluded the pupil. An ectasis of the posterior surface of the completely cataractous lens marked the passage of the foreign body into the vitreous, across which extended a tract of inflammatory material containing pus and disorganized blood. At the bases of the ciliary processes was a dense outpouring of leucocytes continuous with the inflammatory mass. The blood stained vitreous had undergone fibrous change and anteriorly had shrunk into an umbrella-shaped mass. The optic papilla was swollen and it projected well forward into the edematous retina. There was but little exudation about the nerve, and the site of the foreign body was marked by a depression beneath the sheath.

Through a very annoying mishap in the laboratory, the edges of the specimen became so curled that it was impossible to get a section containing all the clinical elements desired. The first satisfactory sections do not show the presence of

the wound in the cornea. The membrane is complete, although the substantial layers are very much separated artificially. The anterior chamber is moderately shallow. The angles are preserved and contain leucocytes which extend well along the endothelial surfaces of the cornea and iris. The filtration area is not specially affected. The iris and ciliary body are infiltrated with small, round cells, the iris to a greater extent than the processes. The iris is attached to the capsule which is covered with exudative cells. The lens is cataractous, portions of it showing large vacuolations. The vitreous chamber contains masses of large mononuclear leucocytes. The chorioid is very densely infiltrated and separates the retina pathologically from it, the retina itself being similarly invaded. The optic papilla is enormously swollen and projects forward into the vitreous mass. The nerve sheath is engorged, the fibers proliferated. The nerve sheath shows extravasations and lacerations near the lamina. In the stump of the nerve to one side of the main vessels is a large irregular crescentic rent caused by the passage of the foreign body. The most marked features in the specimen are the endothelial proliferations and the presence of the wound. There are no epithelial nor giant cells present. The tissues were preserved by Dr. Goldberg and his assistant, Dr. Brinkerhoff.

The points to be noted in this case are: (1) The distance to which a foreign body may be driven by so comparatively slight a force as that generated by an individual's use of hand tools. (2) The accuracy with which Dr. Sweet's assistant localized the foreign body and estimated its size; the chart showed that he had calculated it to be 32 mm. back of the center of the cornea; 5 mm. above the horizontal plane; 8 mm. to the nasal side of the vertical plane; and the size of the body 4x3 mm., all of which were borne out exactly, notwithstanding the fact that the globe was undoubtedly myopic. (3) Although the external signs of injury to the globe were comparatively slight, I suspected from the start that I might have to do with an unusual case because of the ecchymosis of the upper lid, which could not have been caused by any bruising by so small a body as the impacting substance was presumed to be. The ecchymosis was like what one sees in cases of fracture of the roof of the orbit. This sign might be added to those offered by Rubel in his paper on the "Clinical

Diagnosis of Double Perforation of the Eyeball by Splinters." (*Klinische Monatsblätter für Augenheilkunde*, 1911), wherein he states his belief that a subconjunctival hemorrhage, not dependent upon a wound or other bruise of the lower lid, is the most frequent indication of a double perforation of the eyeball. While I was anxious to excise the globe immediately on the receipt of the localizing chart, my colleagues were of the opinion that, as the wounds were small ones and had caused only slight injury to the globe, and as the man still had light perception in his presumably myopic eye, and because they hoped the body might become encysted in the orbit and become harmless, the result would be favorable.

The lodgment of the foreign body in the nerve in this case reminds me of that of Dr. Fisher's in Sweet's series, published in 1907,* and I recall an instance when resident at the Wills Hospital while assisting in the excision of a globe where the surgeon caught an hitherto unsuspected eroded piece of metal in the grasp of the scissors as he severed the nerve.

235 S. Thirteenth Street.

*Trans. Am. Oph. Soc., Vol. XI, pt. 2, p. 388.

A CASE OF BITEMPORAL HEMIANOPSIA WITH
ACROMEGALY AND OTHER SYMPTOMS AP-
ARENTLY DUE TO DISEASE IN THE
PITUITARY REGION.*

S. D. RISLEY, M. D.,

PHILADELPHIA.

On October 10, 1910, Dr. Walter L. Pyle kindly sent to me for consultation Mrs. X., aged 65, who had come under his care as consultant about two years before. She had received glasses from another ophthalmic surgeon to correct a hypermetropic astigmatism, and at that time is reported to have had normal sharpness of sight. There is no record of any impairment of her general health. She states that just before consulting Dr. Pyle she first noticed great difficulty in finding the lines of print when reading, a difficulty which has steadily increased. Dr. Pyle found reduced central vision and a "concentric contraction of the fields of both eyes," but more advanced in the left. Unfortunately these fields of vision have not been preserved.

At that time she was seen in consultation by Dr. Hobart A. Hare, who admitted her to the Jefferson Hospital, took her blood count and blood pressure, and it seems regarded the case as one of anemia, for which she was treated, but without improvement of the visual conditions.

The woman is the mother of four children, two of whom are now grown healthy men; the other two were healthy at birth, but died, one at eleven months, the other at two and a half years. She says her health has always been good and she regards it as good now, and says that she has never had any serious illness.

Notwithstanding this history, she has now an old ivory-like pallor, but no hardness or rigidity of her tissues, as in myxedema. The thyroid glands are apparently normal. She has increased rapidly in weight during the last year and a

*Presented by request before Neurological Section, College of Physicians of Philadelphia, November, 1910.

half, but is not obese. Although not a large person, she now weighs 171 pounds, a somewhat surprising weight for one of her height. She says the increased weight seems to be about her waist and hips, and she has a massive torso. Her arms and lower extremities are those of a person of slender frame. Compared with the size of the arms and legs, the hands, and especially the feet, are large and particularly massive. The finger ends are not clubbed, but the nails are creased and hard. There are no gouty concretions. The anterior portion of the skull seems large and out of proportion to her neck and the posterior part of her head. The under jaw is large, but not projecting, and the face, nose and glabellum large, giving to the face a mask like appearance. Unfortunately, for the sake of comparison, she has had no photograph taken for many years. The lips are thick, purplish in color, and the mouth, when the lips are closed, is a straight horizontal line. The tongue is bluish and large, but possibly not abnormally so, and is not indented by the teeth. The patellar reflexes are absent. The sinuses in anterior part of the skull are translucent, and the frontal sinuses and antrum very large. The heart and general circulation are normal, and the urine shows neither albumen nor sugar. The husband asked the cause of his wife's drowsiness, and inquiry revealed the fact that no sooner does she sit down than she falls asleep; even while talking becomes heavy eyed, sluggish and has often gone to sleep even while eating. She has constant annoyance from an itching over her entire body. Her sense of smell is lost.

The contraction of the fields of vision steadily advanced until when seen by me on October 10, 1910, there was complete bitemporal hemianopsia (Fig. 1), all perception of light by the nasal half of the retina in both eyes being lost up to or near the point of fixation in the right eye and advanced slightly beyond it in the left. In the left eye there is no perception for colors, and there is also a paracentral scotoma triangular in shape and situated above the fixation point well within the retained area of vision. The Wernicke pupillary inaction was absolute in both eyes; there was no oculomotor palsy. The retinal arteries were small, the veins normal. There was some retinal striation near the disk, above and below, along the course of the vessels, and the nasal half of

both optic nerves was gray and distinctly paler in color than the temporal. The bitemporal hemianopsia pointing to disease in the region of the chiasm, she was sent to Dr. William M. Sweet for X-ray study, with the request that he use especial care to discover the presence of a tumor in the pituitary region or any abnormal condition of the sphenoidal or other sinuses, and if possible to determine the presence of any enlargement or notable change of the lesser wings of the sphenoid bone. These studies having been made, I then requested Dr. Charles K. Mills to make a careful study of her condition from the

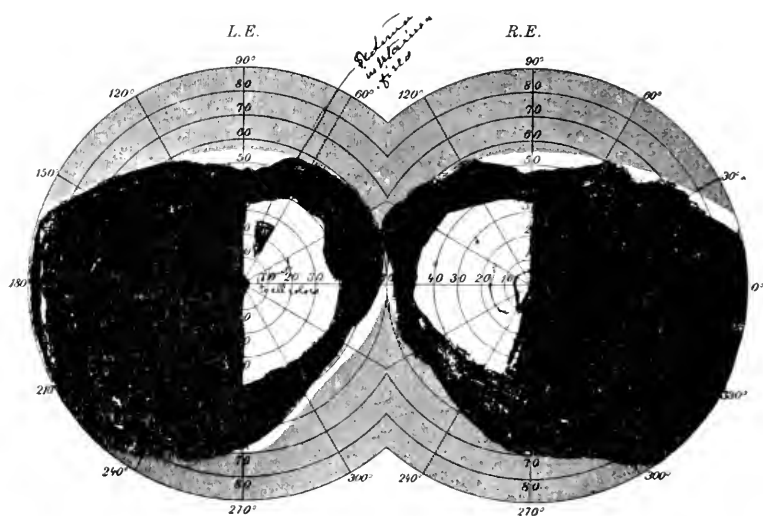


Figure 1.

standpoint of neurology. I received the following communication from Dr. Sweet: "My Dear Dr. Risley: Dr. Manges has at my request made Roentgen plates of Mrs. X. for study with the stereoscope, and careful comparison of these plates with the same region of the head in health shows an unusual enlargement of the bony structures of the sphenoid bone. In the plates the anterior and posterior clinoid processes bend toward each other, forming a nearly complete foramen, both on the left and the right side. These deviations may be in the nature of a hypertrophy of the bone, with the possibility

of a similar change in the soft spots, in which case there would be sufficient pressure for the symptoms manifested."

Dr. Mills furnished me the following memorandum: "Her appearance is peculiar, the face has somewhat the appearance of leontiasis-ossium, at least, it looks broad and is somewhat enlarged. The torso is very large, as are also her hands and feet, especially the latter. The case at least appears to be one of acromegalia, or some form of abnormal increase of the tissues. Knee jerks are both lost, ankle jerks are both lost. Otherwise patient has few demonstrable objective symptoms. Case is probably one of disease of the pituitary."

I then sent the following opinion to Dr. Pyle:

My Dear Dr. Pyle:

October 26, 1910.

Having made a careful study of Mrs. X. in conjunction with Dr. William M. Sweet and Dr. Charles K. Mills, I have asked her to return to you for further advice. My opinion is that Mrs. X. is suffering from acromegaly and that her ocular conditions are a part of this affection. From the standpoint of prognosis her prospect for recovery is bad; that is to say, I do not believe that she will recover her lost field of vision or that the other signs of disease hereafter enumerated will disappear. On the other hand, it is not probable that the vision she now has will be lost. It is possible, however, that the lesser wings of the sphenoid bone may be progressively enlarging; if so, the optic nerves may be subjected to advancing pressure in the canal and so render doubtful the prognosis as to her retaining her present vision. This has been observed in other cases, and the plates made by Dr. Manges show that there is an unusual arrangement of the structures of the sphenoid bone. This view is based upon the following considerations: In the first place, so far as her eye conditions are concerned, my study has confirmed your own; that is to say, she has a bitemporal hemianopsia. In addition to this, she has a well-marked Wernicke's sign, there being no reaction of the iris when light is thrown upon the nasal side of each retina.

A study of general conditions reveals the fact that Mrs. X. is abnormally drowsy, at times falling suddenly asleep sitting in her chair and often at her meals, and that this has been growing upon her. Both hands and feet are enlarged, especially the latter, and she complains of having grown very

stout around her waist, and I found her with an enlarged torso. Then, too, her entire face, as compared to the posterior portion of the skull, is large, the face appearing in some sense like a mask, and when seen in profile, quite characteristic of the acromegalic type. I then sent her to Dr. Sweet for an X-ray study of her head, and while he was not able to say surely that there was a tumor present in the pituitary region, he did find a sella turcica converted into an almost complete foramen. I then asked Mrs. X. to see Dr. Charles K. Mills, since I had found that her patellar reflexes were absent. He made a careful study of her condition and promptly joined me in the diagnosis of acromegaly.

I need not tell you how little encouragement there is in such cases from treatment, since experience does not point to any curative drug for acromegaly or any efficient means of treatment. The therapeutic measure which promises most in my judgment is the prolonged use of pure iodine.

Dr. Pyle reports December, 1911, that there has been no notable change in Mrs. X.'s condition.

2018 Chestnut St.

ABSTRACTS FROM ENGLISH OPHTHALMIC
LITERATURE.

(UNITED STATES OF AMERICA.)

BY

MATTHIAS LANCKTON FOSTER, M. D.,

NEW YORK.

HAROLD G. GOLDBERG, M. D.,

PHILADELPHIA.

OSCAR WILKINSON, M. D.,

WASHINGTON.

AND

ARTHUR F. AMADON, M. D.,

BOSTON.

Simple Bacteriological Examination of the Conjunctival Sac.

GRADLE, HARRY S., Chicago, Ill. (*Ophthalmology*, July, 1911), describes a method he has devised to simplify tests for the presence of the pneumococcus and the diplo-bacillus of Morax and Axenfeld. The difficulty heretofore has been that the mere smear from the sac has not been sufficient and the difficulty in preparing and preserving liquid culture media is considerable. Serum-bouillon is the best medium and the proposed method is as follows: The necessary amount of normal horse serum is evaporated down to a brown film, adherent to the bottom of the tube. Neutral bouillon is sealed in an ampulla. As a tube of media is required the ampulla is emptied into the tube and mixed. The culture material is added to this and should remain clear for about 48 to 60 hours unless bac-

teria are present, in which case it becomes cloudy and opaque within twenty-four hours, depending on the number of bacteria present and the rapidity of their growth. If no laboratory is accessible the proper temperature may be maintained by filling a quart Thermos bottle with water at the temperature of 40° C. and after a few minutes pouring out about half of the water. The test tube may be suspended in this, which will not cool more than 4° in twenty-four hours and the air in the top of the bottle will be sufficient to supply the needs of the organisms

A. F. A.

The Present State of the Question as to the Trachoma Corpuscles.

GREEFF, R., Berlin (*Ophthalmology*, October, 1911), gives a retrospective synopsis, with criticisms, of this peculiar condition found in trachoma. I. The formations have not been exactly determined morphologically, so that they may be surely distinguished from other formations. It is certainly easier than before to find the corpuscles in their well known cap form in the epithelia, but increasingly difficult to find them in other tissues or to examine their initial forms. II. They have frequently been found in cases of trachoma, but not in simple conjunctival catarrh, frequently in blennorrhœa exactly as in trachoma, and the trachoma capsules and gonococci frequently occur in the same specimen. It was only one step further when the capsules were found in the urethra of the mother of a blennorrhœic child. It can be asserted that trachoma corpuscles may be encountered in gonorrhœa of the male and female genital organs. To prove that here are not two different diseases, but different stages of the same disease, we may note a report of Flemming of a case of blennorrhœa neonatorum with moderate secretion, in which for the first few days only trachoma corpuscles were found in the pus, from the fifth day, for a short time, gonococci and trachoma corpuscles in the same specimen, later only gonococci occurred and no corpuscles, and after ten weeks the gonococci had disappeared, and for a fortnight only trachoma corpuscles were found, and if a case is followed up long enough, specimens with gonococci and trachoma corpuscles in juxtaposition will always be obtained. The typical cap form has also been observed in diphtheritic conjunctivitis, with streptococci, with staphylococci and with pneumococci. III. The

conclusion that all cases in which trachoma corpuscles were found belonged to trachoma is no longer admissible. The writer maintains that trachoma and gonorrhœa are two separate and entirely different diseases, because in trachoma we have, from the outset, follicles that are characteristic of the disease and which leave a cirrhosis of the conjunctiva, which in gonorrhœa almost never occur, nor does cirrhosis follow, and gonorrhœal ophthalmia never becomes chronic. Neither can we positively assert that the corpuscles are micro-organisms or parasites, although bacteriologists are more and more inclined to the assumption that they are independent micro-organisms. The opinion is expressed that we do not yet know the significance of trachoma corpuscles, nor have we yet positively determined the pathogenic agent of trachoma.

A. F. A.

The Treatment of Granular Ophthalmia and Its Complications by Sub-Conjunctival Injections of a Solution of Cyanide of Mercury.

ELLIOT, R. H., Madras, India (*Ophthalmology*, July, 1911), reports a series of six cases in which the injections were made in a most skillful and careful manner, in accordance with the directions given by Smith, with the following results: The six selected patients had trachoma in each eye, and the other eye was held for comparison with the one in which the injections were made. Two patients had but one injection each. In one of these there was grave exacerbation of the pannus with severe reaction in the lids, the granules did not disappear and a distinct ptosis manifested itself. In the other case the conjunctival reaction was so severe as to lead to dense scarring which remained several months, or as long as the patient was under observation. He, too, developed ptosis. One patient had two injections, but the pain was so great that the repetition was unwise. In addition the pannus became more dense and the cornea became widely vascularized with a tendency to yield. Ptosis also developed. One patient had three injections, but the pain was so great that he begged to be put on the roller forceps treatment, which had already cured the other eye. Two patients had four injections each. One of these was kept under observation for two months, at the end of which time the injected eye still showed granules, though less than at the beginning of the treatment, whereas the other

eye had been cured by roller forceps. The corneal condition showed improvement under the injection treatment. The last case was kept under observation for over six months. At the end of that time the granules were still prominent and the cornea had improved. He was put on the roller forceps treatment to cure the case. He also suffered from ptosis after the injection treatment. The conclusion is that the injections did not exercise a specific influence over the granules, that the pannus and corneal conditions were not always favorably influenced, but on the contrary, were several times aggravated, that the pain was very severe, that the reactions were often threatening, and that in four of the six cases ptosis followed the injections. This form of treatment has been abandoned by the writer.

A. F. A.

Parinaud's Conjunctivitis, With Report of Two Cases.

LAPSLEY, ROBERT M., Keokuk, Iowa (*Ophthalmology*, October, 1911), reports two cases of this unusual disease, the main characteristics of which are a rapid development of a severe conjunctivitis of one eye only, thickening of the lids, followed by large and sometimes pedunculated granulations. The cornea is seldom affected. The neighboring lymphatics are usually involved. The cause is unknown. The progress is very slow and the prognosis is good. The disease is treated much like trachoma.

A. F. A.

Epithelioma of the Sclero-Corneal Limbus.

DANIS, MARCEL, Brussels (*Ophthalmology*, October, 1911), reports the case of a woman 65 years old, who had a growth of one year's standing at the lower, inner part of the cornea that occupied about one-half of the cornea and involved the infero-internal part of the conjunctiva of the eye-ball. The tumor was 8 mm. high, 6 mm. wide and 3 mm. thick. The inner edge covered a part of the pupil. The tumor was removed and was found to be partially fixed to the cornea and entirely so to the conjunctiva. The wound was cauterized with a galvano-cautery and the conjunctiva was not sewed. Clinically the growth could have been taken for a papilloma, because there was no ulceration, necrosis or hemorrhage, which are usually met with in the case of epithelioma; but the histological examination shows that it is a lobular, pearly epithelioma.

The epithelioma of the conjunctiva may be found almost on the limbus, where the epithelium changes its structure, often it is pigmented, and almost always it is ulcerated. The evolution of such a tumor is very variable and may be benign.

A. F. A.

The Pathology of Superficial Punctate Keratitis, With Remarks on Neuropathic Keratitis in General, and on a Hitherto Undescribed Lesion of the Iris.

(AUTHOR'S ABSTRACT.)

VERHOEFF, F. H., Boston, Mass. (*Archives of Ophthalmology*, September, 1911), presents a brief historical survey, giving Adler (Vienna) the credit of having, first in 1899, established as a clinical entity superficial punctate keratitis. Soon after this Fuchs and others amplified and added to our knowledge of this type of keratitis.

A brief description of the clinical course of a typical case follows.

In his pathological examination Verhoëff gives a careful and minute description of the macroscopical findings with special reference to the superficial punctate spots. These ranged from 1/3 mm. to 1 mm. in diameter, situated immediately beneath the surface, but not elevated above it. They were for the most part centrally located, some coming to within 1.5 mm. of the limbus. Microscopically, much smaller spots are found lying immediately beneath Bowman's membrane. They now prove to be sharply defined, discoid foci of necrotic, polynuclear, neutrophilic leucocytes spreading apart the corneal lamellæ. It is very interesting and significant, in view of the author's theory for neuropathic keratitis, that the smaller foci are seen to be centered about the nerve channels piercing Bowman's membrane, and that in some of the lesions this membrane is most markedly eroded over these nerve channels, naturally suggesting that the disease process is most intense at these points. The bacteriological findings are negative.

The iris shows a very unusual condition, viz.: actively proliferating blood vessels without any of the other phenomena of an inflammatory reaction. These new formed vessels spring from definite points along the course of the normal iris vessels, giving the condition a focal character—resembling in this respect the corneal condition. The author gives good reasons for believing this peculiar condition to be due to an ab-

normal irritation of the sensory nerves or ganglia supplying the iris, either its musculature or blood vessels, probably the latter, ruling out iritis or corneal toxins as etiologic factors. In further support of the neuropathic basis for this vascular proliferation attention is drawn to Von Baresprung's observation that congenital vascular naevi follow the distribution of sensory nerves; and to Cushing's work showing that these naevi are dependent on a pathological condition of the nerves or ganglion cells supplying the affected region.

Verhoeff gives convincing evidence, as adduced from his histological findings, that the punctate spots are neuropathic and are similar in origin to the focal proliferation of the iris blood vessels. The evidence is strongly against bacterial infection as accounting for the condition. Not only does the histological evidence point to a neuropathic origin for this type of keratitis, but his clinical observations are strongly corroborative, viz.:

1. Resemblance to other neuropathic conditions.
2. Diminished intraocular tension.
3. Corneal hypæsthesia.
4. Lesions do not typically occur near limbus.
5. Lesions stain characteristically with fluorescein.

He next discusses the probable character and location of the nerve lesion that produces superficial punctate keratitis, suggesting that it is an irritative lesion due to a systemic toxin which, having a selective action on certain ganglion cells in the ciliary ganglion, constantly sends impulses down to the nerve endings, causing chemical changes that act as toxins, thus producing the typical lesion. The following quotation from the article gives a clearer conception of Verhoeff's neuropathic theory: "It is safe to conclude, however, with Wilbrand and Säger that an irritative lesion is required to produce neuropathic keratitis. Simple withdrawal of nerve impulses is not sufficient. Ample proof of this is furnished by the familiar fact that neuropathic keratitis does not occur after corneal section for cataract, although it has been shown that corneal sensibility is not completely restored for several months. In a previous paper I have brought forward the theory that the irritative lesion gives rise to impulses which pass backward along the sensory nerves to their terminals in the cornea, where they produce chemical changes. The chem-

ical substances thus produced act to a greater or less degree as toxins and thus give rise to the characteristic lesions.

* * * It is self evident that if efferent impulses are constantly passing along a nerve they must produce some change at the nerve terminal, however slight. It is true that as far as can be determined the passage of an impulse gives rise to no chemical changes in the nerve itself, but this is all the more reason why the energy it represents should be manifested at the nerve terminal in chemical changes. Moreover, while our ignorance in regard to the nature of nerve impulses is profound, we do know that every impulse is associated with an electrical disturbance, negative in character, termed negative variation. It is therefore evident that the nerve terminal would correspond to the negative pole in a galvanic circuit, so that it is possible that the assumed chemical changes occurring at nerve terminals may be electrolytic in origin."

The following reasons are given and discussed for locating the lesions in the ciliary ganglion:

1. Restriction of the lesion to the region supplied by the posterior ciliary nerves.

2. Punctate character of the lesions.

3. Diminished intraocular tension.

4. Frequency of bilateral lesion.

Although the author believes the ciliary ganglion to be at fault in the typical cases of superficial punctate keratitis, he also recognizes that a lesion in the Gasserian ganglion itself might give rise to a superficial punctate keratitis.

Traumatic relapsing keratitis is shown to be a form of neuropathic keratitis, the inciting irritative lesion being due to trauma instead of a systemic toxin.

The value of this contribution lies not only in the recognition of superficial punctate as a distinct variety of neuropathic keratitis, but also in the fact that the case reported is the only one in which the pathological findings gave evidence of their neuropathic origin.

Keratitis Punctata Subepithelialis.

GRADLE, HARRY S., Chicago (*Archives of Ophthalmology*, September, 1911), believes that he has observed five cases which do not seem to correspond to any of the well known divisions of keratitis, but practically form a class of their

own. After a description of his cases he tells us that the disease occurs in women, usually past the age of thirty. The inflammation is produced in the form of isolated grayish areas that look infiltrated, lying under Bowman's membrane, with an intact superficial epithelium and characterized by subjective injection and photophobia. It occurs at varying intervals in either eye and is self limited. It does not seem to be affected by any known form of treatment.

H. G. G.

Recurring Corneal Erosions.

WYLER, JESSE S., Cincinnati, Ohio (*Ophthalmology*, July, 1911), recapitulates the classification of Kauffman into three classes, first, traumatic, which heal uneventfully, but show a tendency to recur, even after a considerable time, the epithelium rubbing off en masse over the affected area, while the rest of the surface is shining and smooth; second, those in which the epithelium never recovers its normal condition and transparency; third, those which show no tendency to heal. The author has used the following method of treatment with good results: The eye is made anæsthetic by instillation of 3% novocain, the speculum is introduced, a drop of fluorescein is washed across the cornea to make clear the outlines of the detached epithelium, the stained epithelium is raised and cut away clear to the edge of the detachment. Then a cotton wrapped probe is saturated with freshly prepared and saturated chlorine water and rubbed roughly over the denuded area, a mydriatic is instilled and some 10% xeroform ointment left in the conjunctival sac, after which a firm dressing is applied. After the third day the surface may be healed, if it is not the treatment may be repeated a second or third time.

A. F. A.

Bilateral Marginal Thinning and Keratectasia With Perforation on One Side

SCHUTZ, MILTON H. (*Archives of Ophthalmology*, July, 1911), reports an unusual case presenting this condition with a history of attacks of inflammation of the eyes for a period of two years. The attacks were accompanied by redness and catarrhal secretion, but were not at any time severe enough to cause the patient to seek medical aid. The case was typical with peripheral thinning and degeneration of the cornea (in this case resulting in an ectasia on one side and perfora-

tion on the other), richly vascularized and separated from the rest of the healthy cornea by a saturated gray line of opacity. The case was unusual in the early age of the patient (18 years), the entire absence of an arcus senilis, and the disappearance of the estasia while under observation. H. G. G.

Special Forms of Atrophy of the Iris.

AXENFELD, TH. (*Ophthalmology*, October, 1911), says that the wide range in the dilatability of the pupil in different eyes and in different individuals may come from different causes and the subject has formed the basis of some investigations by the writer. Hyaline degeneration of the pupillary margin may occur in eyes with good vision, in cataract or glaucoma simplex, as well as in degenerated or blind eyes. The clinical picture resembles senile atrophy, except that the latter leads to whitish gaps and apparent indentations of the pupillary margin which the former does not. At first there are small grayish white nodules, which later coalesce and by contraction form an unyielding meiosis, and in high degrees a slight gray seam at the pupillary margin. Again, there may be disturbances of the dilator, as partial phenomena of diffuse atrophy in the peripheral parts. In some cases the change of retinal epithelia into dilator elements seems not to have occurred to a normal degree. Finally he emphasizes the fact that senile cataract is frequently accompanied by pigment atrophy in the pupillary border of the posterior stratum of the iris, in a majority of cases more marked in the lower half, as has been noted in the beginning of cataract, suggesting a common cause for cataract and alteration of the iris.

A. F. A.

An Unusual Case of Ectropion of the Uvea and Extensive Defect of the Iris.

DUNN, JOHN (*Archives of Ophthalmology*, July, 1911), describes a man, age 30, white, who consulted him for the removal of a foreign body in the cornea. When the eye was examined with the mirror it was found that no pupillary reflex could be obtained. Examined with a + 20 D. lens, under oblique illumination, there was found a protrusion into the anterior chamber through the pupil, or from almost the entire pupillary margin, of large masses of brownish-black pigment, which though attached at one end, moved here and there in

the aqueous with the movements of the eyes. The dilated pupil showed large gaps or deficiencies in what may be termed the inner circle of the iris. The deficiencies in the iris in no way resembled the smooth-edged, clear-cut coloboma iridis. The fundus was normal and the vision in each eye 16/30.

H. G. G.

Experimental Production of Congenital Cataracts and Malformations in the Eyes of Vertebrates, With Episcopic Demonstrations.

PAGENSTECHE, H. E., Strassburg (*Ophthalmology*, October, 1911), succeeded in producing congenital cataracts in 100% of rabbits by intoxicating pregnant rabbits with naphthalin, and in raising the cataractous young animals of three litters. By these experiments he conclusively ascertained that congenital cataract may be the result of toxic influence during gestation and that it develops independently of the separation of the lenticular vesicle, as the feeding was always begun after the time of separation. He also succeeded in producing at will ten different kinds of ocular malformations by the same methods, feeding at different periods of gestation. Two animals were fed at the time of separation of the lens, with the result that a malformation of the lens was produced in both. In one litter the feeding was at a later period and produced microcornea, and in another litter the result produced was microblephary and total adhesion between cornea and conjunctiva. In three litters the development of the lids could be arrested. The same mother later without naphthalin feeding gave birth to normal progeny. One of the cataractous animals already has young ones whose eyes are perfectly normal. The experiments prove that toxic damage to certain formative processes of foetal development may lead to malformations, and they also repudiate the prevalent opinion that all ocular malformations are due to an anomaly of the germ and heredity.

A. F. A.

A New Method of Operating for Cataract and Artificial Pupil

HUIZINGA, J. G., Grand Rapids, Michigan (*Ophthalmic Record*, July, 1911), states that his limited success in experiments with the Smith operation for cataract led him to a further study of the problem of secondary cataract. The operation and instruments described in this article are the result.

As a preventive of secondary cataract he advocates the removal of the entire anterior capsule, and says he has done this in several cases very successfully. For this purpose he has devised three new instruments: a swivel cystotome a tenacular hook and a tenacular forceps. By means of the swivel cystotome an incision is made which encircles the entire anterior capsule. The tenacular hook and the tenacular forceps are more useful in grasping the anterior capsule than the ordinary capsule forceps. The swivel cystotome is particularly useful in operations for an artificial pupil. An important feature of these instruments is that they should be as sharp as possible.

The operation is described at length and differs materially from the ordinary cataract operation and also from the Smith operation. Its advantages are, complete removal of the anterior capsule, retention of the posterior capsule to support the vitreous, of which there is no loss, no pocket formations for retention of lens debris, thorough cleaning of the anterior chamber, danger of inflammatory reaction considerably lessened, and in operating for artificial pupil it is possible to make a pupil of any size or shape in any desirable location.

O. W.

Some Observations and Lessons of the Smith Operation for Cataract, Based Upon Two Hundred and Seven Cases Operated Upon in the Clinic of Lt. Col. Henry Smith, Amritsar, India.

TIMBERMAN, ANDREW J., Columbus, Ohio (*Ophthalmology*, July, 1911), bases his observations on the 207 cases operated on by himself, as well as about an equal number operated upon by Dr. King and about as many by Dr. Smith himself and others, making quite 600 cases in all. After observing 80 cases in three days in Smith's clinic, the writer essayed his first operation there. For three weeks his confidence became inversely less. The operation seemed so simple; it proved so complex. It seemed so reliable; it proved so fickle and uncertain. Smith, from his experience with 25,000 cases, could tell how the eye was going to act; others could not. Large observation will convince any one that the loss of vitreous, per se, offers no reasonable objection to the acceptance of this method of cataract extraction. In the series of 600 cases there was not one case lost that could honestly be accounted for by this incident. Strikingly good results were observed

in those cataract cases complicated with seclusion of the pupil. To see these apparently firm adhesions give way one by one until the whole pupillary margin was freed, the lens with both capsules emerge from the eye and to feel that there was nothing left to impede the pupil or to interfere with vision, made evident the practicability of this operation in this class of cases. The most potent objection to the Smith operation is likely to be the difficulty in replacing and adjusting the iris. With no membrane between it and the vitreous the difficulty is obvious. Still, we find a smaller percentage of patients operated on by the Smith method coming back for an operation for displaced or distorted pupil than we will among those operated on by the old method. There seems to be an almost complete absence of iritic sequelæ after the intracapsular operation, which is the incomparable advantage of this operation. Even when it does appear it is comparatively easy to care for it because there are no adhesions, capsules or tags of membrane adherent to it to exert tension, and if exudate occurs it seems to be readily absorbed, because the mass is entirely surrounded and bathed by the humors of both chambers of the eye. After these further opportunities for observation of this method of operation the writer is still of the same opinion as was expressed by him a year previously, that because of the extreme difficulty of mastering the technique of the operation, even by one who is familiar with and skillful in the old method, except by considerable opportunity to see the work done by an expert in the operation, the method is placed beyond the pale of popular usage by the ophthalmic profession.

A. F. A.

The Position of the Eye the Element of Safety in the East Indian Extraction in Capsule.

STANDISH, MYLES (*Ophthalmic Record*, September, 1911), says that he has done this operation several times and has seen it done by Dr. Greene, of Dayton, Ohio, and has never seen a prolapse of the vitreous when the patient did not look down during or immediately after the operation, before the eye was closed. This fact decided him to try to extract dislocated lenses by a slight modification of the Smith method, and he has done so in two cases.

The first was a man 42 years old, in whom the lens was dislocated upward, outward and backward, so that only a crescent of its edge remained in the dilated pupil. The incision

was made as in the Smith operation, some fluid escaped, the patient looked up strongly when directed to do so. Counter-pressure was made above the wound and pressure was applied at the junction of the middle and lower third of the cornea, directly backward toward the center of the eye. The lens moved forward to the middle of the wound and emerged without its capsule, which retracted toward the position which the lens held before the operation. Healing was uneventful, the pupil and coloboma of the iris being free of lens capsule.

The second case was a man 33 years old. Here a roll of vitreous appeared in the lips of the wound. Upon direction the patient looked up strongly and steadily. The point of the strabismus hook was applied to the sclera below the margin of the cornea and beyond the greatest convexity of the lens. Pressure was made directly toward the center of the eye. The lens moved across the anterior chamber, the upper edge engaged in the lips of the wound and emerged in capsule. There was no loss of vitreous and recovery was uneventful.

O. W.

Intra-Ocular Irrigation After Cataract Extraction.

LUKENS, CHARLES, Toledo, Ohio (*Ophthalmology*, July, 1911), says that intra-ocular irrigation is an established and safe surgical procedure after cataract extraction, especially after the combined operation when the anterior chamber is more or less filled with blood or cortical debris, or the iris is prolapsed. All of these conditions are usually removed in a few seconds and we may secure a brilliant, black pupil and clean iris and coaptation of the edges of the wound for rapid healing. A simple, cleanly apparatus must be used for the irrigation, as satisfactory a device as any being one much like an enlarged eye dropper, the tube holding six drams, as much as may be used for an irrigation, without any part of the solution coming in contact with the rubber bulb, which will contain somewhat less. The nozzle is bent and throws a small stream against the lips of the wound in such a way that a part of it enters the anterior chamber and removes all debris from in front of the iris and if need be floats a presenting iris back into the anterior chamber. By this method cataracts with soft cortex may be removed with nearly the same degree of safety as the mature cataract. While intra-ocular irrigation is not a routine procedure after cataract extraction, it should be available when indicated.

A. F. A.

The Association of Uncinariasis (Hook Worm Disease) With Cataracts.

PEINIZY, CALHOUN F., Atlanta, Ga. (*American Journal of Ophthalmology*, September, 1911), reports several cases of cataract met with in patients suffering from uncinariasis, which seem to him to indicate that the cataracts were caused by the anæmia produced by the uncinariasis. M. L. F.

A Hitherto Undescribed Term in Skiascopy.

CLAIBORNE, J. HERBERT, New York (*Ophthalmology*, July, 1910), describes a sign in retinoscopy not before described, viz., the behavior of the shadow in spherical errors, and when the mirror is rotated on its antero-posterior axis. When the mirror is turned in a circle in this manner, either in spherical myopia or hypermetropia, the shadow moves in a circle, and ultimately always in the same direction with the movement of the mirror. It resembles a rotating circle, the shadow chasing itself around the pupil. With the concave mirror, in hypermetropia the circle is seen to creep in from the opposite side of the pupil and move around the pupil in the opposite direction from the movement of the mirror, yet each shadow chases the other in the same direction. In myopia the shadow appears on the same side of the pupil as the mirror starts, moves with the mirror, and chases itself around the pupil, as in hypermetropia. The movement in both cases is purely circular, and the shadow appears to move in the same direction, though in the two cases it starts from opposite directions. In astigmatism the shadow stops at the meridian of division, beginning again on the opposite side of the meridian. In mixed astigmatism and with the mirror moving slowly the shadow may be seen behaving appropriately in each quadrant.

A. F. A.

A Fenestrated Six Diopter Concavoconvex Axis Disk for the Neutralization of Toric Lenses.

RHOADS, J. N., Philadelphia (*American Journal of Ophthalmology*, October, 1911), describes an instrument he has devised to assist in neutralizing toric lenses. The action of the instrument is based on the cutting off of the aberrant rays of light. M. L. F.

Distortions of the Visual Fields in Cases of Brain Tumor.

CUSHING, HARVEY, AND HEUER, GEORGE J., Baltimore (*Jour. A. M. A.*, July 15, 1911), present the second paper of a series on this subject, the first of which, published in the Johns Hopkins Hospital Bulletin, June, 1911, contained some statistical studies of the results of perimetry in two hundred case of brain tumor. Reliable perimetric observations were made in one hundred and twenty-three of these cases. Normal fields were present in twenty-seven, a tendency to hemianopsia in forty-two, and color interlacing or inversion (dyschromatopsia), with more or less symmetrical constriction, in fifty-three. This paper deals with the cases that showed dyschromatopsia, and correlates them, so far as possible, with the stages of advancing choked disk. These cases are divided into three groups: 1, those in which, in the total absence of even an incipient grade of choked disk, interlacing was bilaterally equal; 2, those in which interlacing was unilaterally represented; 3, those in which interlacing coincided with a low grade of choked disk, but disappeared after a decompression, before the subsidence of the œdema. Individual cases are described in detail. The summary is as follows:

Out of the one hundred and twenty-three cases in our tumor series in which perimetric observations could be made, fifty-three showed simple color-interlacing or inversion with more or less constriction of the field boundaries.

In ten of these fifty-three cases the dyschromatopsia either actually preceded any recognizable ophthalmoscopic change in the eye-grounds or accompanied most incipient stages of choked disk. These distortions of the color boundaries, therefore, promise to be of some service in the making of a more precocious diagnosis of an increase of intracranial tension than is commonly ventured on. Thus, in a number of cases of early tumor extirpation, color inversion and interlacing, in addition to attacks of Jacksonian epilepsy, were the only clinical indications of the lesion.

We have attempted to correlate the perimetric deviations, observed before and after operation, in the remaining forty-two cases of simple dyschromatopsia, with the accompanying grades of choked disk subdivided into six groups according to Marcus Gunn's classification.

Until the perception for colors is completely lost, inversion

or interlacing is often apparent, even in the greatly constricted color peripheries characterizing the advanced stages of choked disk.

Though permanent achromatopsia is usual, total loss of vision is by no means inevitable even when the process has advanced into Gunn's fifth stage. M. L. F.

The Field of Vision in Tabetic Atrophy of the Optic Disc.

FUCHS, E., Vienna (*Archives of Ophthalmology*, September, 1911), does not agree with the hypothesis that the central scotoma is a complication of tabes, but believes that it is a sequela. In explanation he reminds us that the central scotoma in tabetic atrophy is nearly always bilateral: this was true in all of his cases, and he claims that there are but a very few one sided cases on record. Central scotoma is most common in toxic amblyopia, mainly from poisoning by tobacco and alcohol. The contradistinction from the tabetic cases is evident. In the toxic cases the periphery of the field always remains normal, and also the color perception outside the scotoma. In toxic amblyopia it looks normal in the beginning, and only later on becomes pale in the temporal half. In the tabetic cases, on the contrary, the discs are pale from the very onset, and farther on the pallor spreads from the temporal to the nasal half. It is more difficult to distinguish the tabetic cases of central scotoma from those due to syphilitic retrobulbar neuritis, so much the more as in the latter abolition of reflexes, or Argyll-Robertson pupil, may also be present in consequence of cerebral syphilis. The writer has never seen a case that he could attribute to syphilis alone; in all of his cases there were the strongest evidences of tabes, and all of these cases went blind in spite of treatment. He does not deny that cases of syphilitic retrobulbar neuritis do not exist, but affirms that in the great majority the central scotoma does not form an accidental complication, but an integral part of the tabetic processes. He speaks of another exceptional type of alteration of the visual field in tabes: bitemporal hemianopsia. This condition is indicative of a lesion of the decussating fibers situated at the inferior side of the chiasm. Such an inflammation has also been supposed to be produced by syphilis and to have caused bitemporal hemianopsia in tabes. According to the writer's belief, although he describes such

a case as coming under his own observation, the condition is in most cases of tabes to be considered not as an accidental complication due to syphilitic inflammation, but as a genuine tabetic affection. H. G. G.

Retrobulbar Neuritis as an Exact Diagnostic Sign of Certain Tumors and Abscesses in the Frontal Lobes.

KENNEDY, FOSTER (*Amer. Jour. of the Med. Sciences*, September, 1911), reports six cases expanding lesion of the frontal lobes. In five the accuracy of the diagnosis was proved by operation, in the sixth a palliative decompression did not reveal the tumor, but the coincidence of its symptomatology with that of the others warrants its classification with them. These six cases reveal a symptom complex which is easily discoverable when looked for, and is, he claims, decisively diagnostic because it cannot be simulated by any lesion failing to exert pressure on the inferior surface of one or the other frontal lobe. This symptom complex is the occurrence of true retrobulbar neuritis with the formation of a central scotoma and primary optic atrophy on the side of the lesion, together with concomitant papilledema in the opposite eye. If there is no doubt that a patient has a brain tumor and if that patient develops a unilateral retrobulbar neuritis, then it is certain that the tumor is situated in the lower part of the frontal lobe on the same side as that on which the retrobulbar neuritis and primary optic atrophy have occurred. M. L. F.

Total Blindness From the Toxic Action of Wood Alcohol, With Recovery Under Negative Galvanism.

ZEIGLER, S. LEWIS, Philadelphia (*Ophthalmology*, July, 1911), says that the toxicity of wood alcohol may be manifested as the result of ingestion, inhalation or cutaneous absorption. Sudden blindness, as a rule, follows its use as a beverage, but failure of vision has followed inhalation of the fumes for an hour a day, and cases have been reported of poisoning after an alcohol rub-down after a Turkish bath. Doubtless individual idiosyncrasy may be present in these cases. Wood alcohol has been used not only as a beverage, but, unfortunately, the cheapness of the drug has led manufacturers to substitute it for grain alcohol in the preparation of extracts, in the cheaper liquors and toilet articles, and also to use it to for-

tify such mild drinks as ginger ale and bottled cider. The acute symptoms following the use of wood alcohol are usually headache, dizziness, weakness of the extremities, nausea, abdominal pain, chilliness, prostration, delirium, stupor and death. As a rule, blindness does not appear until the day after ingestion. The facts of interest in the case reported are as follows: There was total loss of vision for almost two months, with wide and fixed pupils. The disk showed no cedema, but was constantly blanched and atrophic and the blood-vessels attenuated. The visual power returned soon after revascularization of the nerve-head under the stimulating influence of negative galvanism. The lesions that were present were the result of an acute corrosion of the nerve fibres, without inflammation, early cedema or subsequent strangulation. The blanching of the nerve-head was due to the contraction of the blood-vessel walls and there was no secondary shrinking of the nerve, as is often the case. The treatment of the acute stage consists of the administration of eliminants and alteratives. The increased hyperemia of the nerve-head and the continued improvement in vision under the influence of negative galvanism demonstrate its specific value in such cases. A. F. A.

Does Cutting of the Optic Nerve Elicit Perception of Light?

EMERSON, LINN, Orange, N. J. (*Ophthalmology*, July, 1911), reports a case in which a glaucomatous eye was removed under alypin anesthesia and when the optic nerve was cut the patient said that he felt no pain but saw "lightning," leaving no doubt in the surgeon's mind that the cutting of the optic nerve elicited the sensation of light, contrary to other reported cases. A. F. A.

The Operative Treatment of Glaucoma by Iridotaxis.

BORTHEN, JOHAN, Bergen (*Archives of Ophthalmology*, July, 1911), claims that his experience with the Holth operation and a tongue shaped iris flap has been favorable. Of twenty-six cases, nine were cured, nine unimproved, and eight could not be followed up. He has always doubted the advisability of incising the iris and making a flap for incarceration, believing this part of the operation to be unnecessary, and is convinced that the same effect could be produced by inclusion of a fold of the iris, allowing its posterior surface to coalesce

with the subconjunctival tissues, assuring a position of the sphincter external to the section, and with this free drainage. The writer states that he has operated in the manner described on fifty cases and has not seen a single case of simple or absolute glaucoma in which it failed. A comparison of this series with the twenty-six operated on according to Holth has convinced him that his simplified procedure is the better, and that the incision of the iris, which was supposed to be of such importance for the formation of a permanent fistula, has, on the contrary, the effect of diminishing the prospects of permanently reducing tension. Finally, he claims, it is worth noting, that iridotaxis may be ineffectual where the iris is atrophic, even if subconjunctival œdema appears after the prolapse. In conclusion he lays stress on the importance of operating under atropin mydriasis so that complete paralysis of the iris may prevent spontaneous reposition, and on the advisability of avoiding forcible traction on the iris after it has been brought out through the scleral section in very old patients with a rigid iris.

H. G. G.

A Case of Sympathetic Ophthalmia, First Appearing Four Days After Removal of the Exciting Eye, With Histological Report.

WELTON, CARROLL B., Peoria, Ill. (*Archives of Ophthalmology*, July, 1911), describes his case in detail and reports that upon microscopic examination there was found, of special interest, epithelioid cells and giant cells. He has collected, in addition, twenty-seven cases described by other writers. In all of these he finds that the shortest interval between the injury and enucleation was a period of nine days and the longest interval was two months. The length of time between the injury and the preventive enucleation seems to bear no relation to the onset of sympathetic trouble in the fellow eye beyond a period of nine days, as enucleation was performed at varying intervals from that time up to two months. The shortest time between enucleation and the outbreak of sympathetic disease in the fellow eye was two days, and in twenty-seven cases the disease appeared during the first month. This shows the time of onset of sympathetic ophthalmitis after enucleation to be within a month. Of the twenty-seven cases, in which final visual reports were given, sixteen, or 59%, recovered with normal vision. In seven cases the visual capacity

was reduced, and in four vision was lost. From an analysis of these cases it is not justifiable to conclude, as many do, that the process is one in which the infectious agent is carried to the fellow eye by the general circulation? The disease would be arrested at once by the enucleation if the process were confined to that organ alone, but as this does not prevent in all cases the progress of the disease in the sympathizing eye, there must occur an outpouring of the infectious agents into the general circulation, which the removal of the source of the infection—that is, the removal of the exciting eye—is powerless to control.

H. G. G.

The Indications for Operation in Heterophoria and Squint.

DUANE, ALEXANDER, New York (*Archives of Ophthalmology*, May, 1911), states that to set forth clearly the indications for operation in squint and heterophoria we should be prepared to answer the following questions: (1) Why should we operate at all? (2) When shall we operate? (3) How shall we operate? The answer to the first question will hinge upon our reply to the following: (1) What are the symptoms for which we operate? (2) How far can we be sure such symptoms are due to muscular errors? (3) How far can we hope permanently to relieve such errors and their resultant symptoms by operation? (4) What are the direct and remote dangers and discomforts of the operation and the chances of failure? (5) What will be the result if we do not operate? He then describes in more or less detail the symptoms demanding operation, such as: (1) Disfiguring squint. (2) Pronounced head tilting or actual torticollis. (3) Imperfect fusion power. (4) Diplopia. (5) Confused vision. (6) Vertigo, and (7) Nausea. (8) Pain in the eyes. (9) Conjunctival irritation, and (10) Asthenopia. (11) Headache, and (12) Reflex disturbances (remote pains; digestive disorders causing malnutrition; ties of various kinds). His diagnostic points to be considered before operating will determine: 1. The precise kind of deviation present and the nature of the underlying pathological condition. 2. The refraction and accommodation of the eye. 3. The presence of troubles in other organs likely to cause reflex symptoms. 4. The effect of treatment addressed to conditions enumerated in (2) and (3), and the effect of treatment other than operative addressed to

the relief of the muscular deviation. The prognostic points to be considered before operating are: (1) Prospect of relieving the symptoms by operation. (2) Possible dangers and disabilities produced by operation, and (3) What will happen if we do not operate? He then considers the time to operate, which he divides: (1) When shall we operate and the preparation for operation. His method of operating is influenced by the following conditions: (1) Esophoria and esotropia. (2) Exophoria and exotropia. (3) Hyperphoria and hypertropia, and (4) The technique of operation.

H. G. G.

Phorometry of Normal Eyes in Young Male Adults.

FIELD, P. C. (*Archives of Ophthalmology*, September, 1911), tells us that the object of the tests was primarily to determine in his own mind how many normal eyes had perfectly balanced extrinsic ocular muscles, or how many normal eyes really had a varying amount of so-called imbalance, or, if you please, latent disturbance of equilibrium, without manifest squint or other symptoms. His opportunities for making these studies were very unusual; the first examination was made after the men had had two weeks of a month's vigorous training, and was made with a Stevens' phorometer. The second test was made by the same instrument after the men had been benefited by two more weeks of physical training, and was confined to 25% of the original number taken at random. The third test was made within twelve hours after the second test, with the same number of men and was the ordinary test for convergence and divergence and vertical deviation. A summary of his results follows:

1. That $\frac{1}{2}^{\circ}$ to 1° of hyperphoria and $\frac{1}{2}^{\circ}$ of esophoria and exophoria are unimportant, probably often due to spasm, too often changing to opposite readings at repeated examinations with the phorometer, and hence not indicative of a true heterophoria.

2. That too large a proportion of small latent deviations, both lateral and vertical, disappeared during a strict course of training with greatly improved physical condition, to ignore the claim that improved physique, or the opposite, does affect the tone and balance of the extrinsic ocular muscles.

3. That only eleven out of one hundred normal individuals with normal eyes had perfectly balanced extrinsic ocular mus-

cles is strong evidence that it is not usual or necessary for normal eyes to have absolute muscle balance.

4. That the ordinary prism test for the individual muscles, considered with fixed ratios, when not checked by other tests, does not necessarily show "latent disturbance of equilibrium" of 1° to 2° , and, further, that this is more accurate in showing a real deficiency than the phorometer test.

5. That the power or tendency to fuse is weakest and slowest in those who have no latent deviation to constantly overcome by increased innervation. Hence the prism test for individual muscles, if hastily made, may give a false idea of strength and balance.

6. That the prism test and the Maddox rod test proved more accurate in showing real deviations. H. G. G.

Paralysis of the Orbicularis Palpebrarum Traumatica—Retinitis Proliferans.

WEIDLER, WALTER BAER, New York City (*Ophthalmology*, July, 1911), says that paralysis of the orbicularis palpebrarum alone is not common, it is usually associated with paralysis of the other muscles of the face. Isolated paralysis of the orbicularis tends to substantiate the claims put forth by Mendel that the oculo-facial group of muscles are innervated by the third nerve nucleus, the fibres passing into the trunk of the seventh nerve by the way of the posterior longitudinal bundle. If this is true we can readily understand why the pupil should contract if a strong effort is made to close the paralyzed eye, or if the lids are held open forcibly by a speculum, as it frequently does. Gifford states that this reflex is useful in diagnosing paralysis of the sphincter iridis, as in cases of disease of the muscles of the third nerve in brain tumors, or to help to determine whether a dilation of the pupil is due to a mydriatic. In this connection it is interesting to bear in mind that the orbicularis palpebrarum consists of three parts, a superficial or palpebral part, a ciliary, and a deep or orbital portion. The case history which follows shows that the patient received injuries in front of the left ear, on the face, the jaw and the neck, and two days later was unable to close the left eye, with the usual combination of symptoms. The superior temporal portion of the retina was seen to be covered with a mass of "tissue formation." Throughout the

peripheral portion of the fundus there were great quantities of irregularly shaped and arranged pigment spots and masses. Nux vomica up to thirty drops t. i. d. and local applications of the faradic current were used for four or five months. Potassium iodide was also given when it was found that he reacted positively to the Wassermann test. Our prognosis will depend upon the length of time that has elapsed before treatment, coupled with the response we get from electrical stimuli.

A. F. A.

Partial Tenotomy.

O'CONNOR, R. P. (*Ophthalmology*, October, 1911), makes an incision across the tendon near its insertion, including all but the lateral fibres. A few millimetres back from the first incision the lateral fibres are cut on both sides of the tendon. When the tendon is put on the stretch the cut sections take a shape like a stirrup, lengthening the tendon in proportion to the completeness of the cuts. A lengthening of 3 mm. means a correction of 14° of error. By cutting one edge more than the other a cyclophoria may be corrected.

A. F. A.

Native Gunpowder Injuries of the Eye.

ELLIOT, R. H., Madras, India (*Ophthalmology*, July, 1911), says that during the closing months of each year a number of gunpowder wounds of the eyes are seen in India, due to the fact that at that time there are feasts at which explosives are used which, to a certain extent, are prepared at home, especially among the poorer classes. Such manufacture is illegal, but none the less quite common. The most common form of explosive is prepared by making a mixture of sulphide of arsenic and chlorate of potash. After this has been gently rubbed together by digital pressure it is mixed with gravel, carefully wrapped in paper and cloth and is exploded by concussion. After the mixture with gravel the danger of explosion is greatest and the eyes suffer most frequently. The mixture slowly dissolves in the tissues where it is lodged and produces a chemical irritation, followed by chronic irido-cyclitis, not infrequently culminating in loss of vision and even of the eye. It is very difficult to remove the granules and little can be done except the use of atropin and treatment along general lines.

A. F. A.

The Removal of a Piece of Steel From the Apex of the Orbit.

WOOD, CASEY A., Chicago, Ill. (*Ophthalmology*, October, 1911), reports the unusual and interesting case of a man who was struck on the temporal edge of the left orbit by a piece of steel. No evidence of penetration of the eye-ball was at any time discovered, but the eye remained irritable until ten months later, when the other eye began to show evidence of sympathetic irritation. Then the fragment of steel was discovered by the use of the X-ray, located at the orbital apex. The eye was seen to contain the remains of a diffuse hemorrhage, a neuritis, and probably a small detachment of the retina. An opticoneurectomy was done and it was found impossible to dislodge the body until a portion of the orbital wall was resected. The eye-ball was removed and it was found that the piece of steel, 5 mm. x 2 mm. x 3 mm. had passed through the whole length of the orbit and was deeply imbedded in the tissues. The patient made an uninterrupted recovery.

A. F. A.

On a New Model of My Large Eye Magnet, and the Employment Method of These Instruments.

HAAB, O., Zurich (*Archives of Ophthalmology*, September, 1911), condemns the practice of incision through the sclera for the removal of iron foreign bodies in the vitreous chamber and maintains that the method is a perversion of his teaching. He claims that it unnecessarily exposes the eye to the dangers of infection, of loss of vitreous and of ultimate detachment of the retina. He believes that, with patience, the foreign particle can be worked forward between the lens and ciliary body with a minimum of injury. He seems to lay particular emphasis upon his statement that whoever possesses the largest magnet will have the least number of ill successes, after which he describes his latest instrument as follows: In principle the magnet corresponds to his first model, but the distribution of iron and coils is different. The magnet can be revolved and is fastened on a solid stand; there is only one pole which possesses a tip, the current is introduced and controlled by a lever at the lowest part of the stand. The pole which is used represents a cone of 90°, the winding of the coils at this end is conical like the magnet; this permits a large visual field for the operator. There are four different tips—one long

and thin, of 42° , one of 90° with a sharp extremity, one of 90° and of a slightly rounded extremity and a flat tip

H. G. G.

On the Magnet Operation.

HAAB, O., Zurich (*Ophthalmology*, October, 1911), states that it is necessary to localize the foreign body by Roentgen rays or sideroscope, since the large magnet itself searches out the piece, wherever situated. The foreign body must be prevented from penetrating the posterior surface of the iris and therefore the patient should be in a sitting position, so that he can retract his head as soon as the piece arrives behind the iris and the operator must have control of the current with his foot. This prevents the particle from becoming entangled, or being drawn to a place where it is not desired. If the chip is lodged in the posterior part of the eyeball it frequently must first be drawn laterally. The action of the magnet can always be controlled by the distance at which it is held or by using a longer tip. If possible the particle should be drawn through the anterior chamber and as rarely as possible at the side through a scleral incision involving the danger of a later detachment of the retina.

A. F. A.

Improved Illumination for the Zeiss Binocular Corneal Microscope —Used in the Study of the Episcleral Vessels and Their Circulation.

LUEDE, W. H. (*Archives of Ophthalmology*, July, 1911), has added to this instrument a small six-volt Tungsten lamp which offers many advantages. He believes that one reason why the instrument has not been in more common use in ophthalmology is its insufficient illumination. He claims that the ability to discover certain pathological changes earlier and to determine their character and extent is greater with this instrument than by any other method. With the improved illumination, the blood vessels can be studied with an enlargement of 65 diameters. He has observed the oscillatory flow of blood without reference to the pulse rate; this has never before been mentioned. The writer continues, that the Zeiss binocular microscope in its greatest efficiency, with patient study promises accurate information otherwise unattainable and is of enormous interest in other lines as well as in ophthalmology.

H. G. G.

Tonometry. With a Description of a New Tonometer.

SCHIÖTZ, H., Christiana (*Archives of Ophthalmology*, September, 1911), says that tonometers are of two kinds: those which produce an impression in the capsule of the eyeball, of a constant depth, where the forces necessary to accomplish this varies according to the degree of the intraocular pressure; and those with constant force, where the depth of the impression varies. At first the inventor constructed an apparatus which produced a constant impression where a small mercury manometer permitted the reading of the recorded force. Finally, he used a tonometer with constant force and varying impressions; in other words, a combination of both systems. The almost daily use of the instrument, during the past two years, has shown it to be practical and reliable. He tells us of his experiments with the use of mydriatics and miotics, and of the changes in intraocular pressure of many of the diseases of the eye and in health. It is interesting that the measurements before and after enucleation in a glaucomatous eye, with very high pressure, 122 mm. Hg., showed after enucleation, a pressure of 72 mm. Hg. In a normal eye, with 19 mm. Hg. pressure, after enucleation the pressure was equal to nothing.

H. G. G.

The Relation Between General Arteriosclerosis and Increased Tension in the Eyeball.

SNYDER, WALTER H., Toledo, Ohio (*Ophthalmology*, July, 1911), says that the trouble with nearly all instruments for the measurement of the tension of the eye is that they have been laboratory rather than clinical devices. Such is not the case with the Schiötz instrument. A year's use of the instrument makes it possible for the writer to say that his patients have made no objection to its use, the whole observation, including looking up the chart, does not consume over two minutes, and there is very little mechanical difficulty in its use. The only difficulty is that we have no way of knowing what is the normal tension of the eye under observation. One can readily see that if the normal tension of the eye being tested is 18 and the tension is found to be 26, the diagnosis of hypertension would be more certain than if the normal of that particular eye were 22 and the tension were found to be 26, which condition is the very one in which we most desire accurate meas-

urements, viz., in primary simple glaucoma with but little, if any, cupping and hardly any appreciable rise of tension as ascertained by palpation. For the sake of uniformity we should have an invariable routine for testing. From this instrument we find that pilocarpin and eserine will reduce tension, even with the iris absent, or after an iridectomy, and that atropin or cocain increase it is doubtful, except in marked cases of glaucoma. In normal eyes the effect is practically nil.

A. F. A.

On the Effect of Antoxylon on the Eye.

IGERSHEIMER (*Archives of Ophthalmology*, July, 1911), reports the following changes in the retina: A degeneration in the ganglion cells, changes in the inner granular layer which consisted in a great mass of cells with a large and deeply colored nucleus, besides granules which were normal or slightly changed in their form, especially quite close to the papilla. These cells retained a considerable amount of protoplasm around the nucleus and presented frequently fine, delicate prolongations into the surrounding basement substance. The nucleus itself had an indented appearance. This made it improbable that they were lymphocytes or wandering cells, and the elements were never found in a greater number about the vessels. It is most probable that we have to deal with transformed inner granular layer cells and with shrinking processes within the nucleus of the cell. Similar cells are occasionally found in small numbers in normal specimens. The great mass of these cells and the destruction of the normal inner granules indicate a pathological process. This condition is by no means limited to atoxylon alone, but the writer found it also in experimental poisoning with arsenic and anilin. In his experiments the external parts of the retina showed as few pathological changes as the other membranes of the eye. Inflammatory processes were not present. H. G. G.

Ocular Findings in Hereditary Syphilis.

STIEREN, EDWARD, Pittsburg, Pa. (*Ophthalmic Record*, July, 1911), remarks that affections of the lids are not often seen in hereditary syphilis. He has recently seen a case of blepharitis with loss of the lashes and partial loss of the eyebrows in connection with the peripheral chorioidal lesions seen only in inherited syphilis.

Interstitial keratitis is usually met with between the ages of eight and fifteen. It is the most frequent ocular lesion in hereditary syphilis, and is characterized by a leucocyte infiltration into the substance of the cornea. This may be studied in three stages: infiltration, vascularization and resolution. Opacities of the lens may develop from this, being caused by the adhesions or exudates which may have formed in the pupil. Glaucoma may also develop from plastic material blocking the filtration angle.

Iritis is not usually seen in syphilitic infants. It shows later in life and differs from the acquired form by its slight inflammatory reaction. It is apt to cause posterior synechiae and pupillary obstruction by its plastic exudate. This is also seen under different forms; the serous, acute and gummatous.

Acute chorioiditis is rarely seen in inherited syphilis. It is usually of pre-natal origin and under the ophthalmoscope shows cicatricial and atrophic lesions.

Optic neuritis, contrary to opinions formerly held, is frequently seen in congenital syphilis. It usually occurs within the first two years and readily yields to mercurial inunctions.

The motor nerves of the eyeball are sometimes affected in subjects of inherited syphilis and a large percentage of luetic children are cross-eyed.

O. W.

Copiopia Hysterica.

SHAILAN, WM. E., St. Louis (*American Journal of Ophthalmology*, October, 1911), reports two cases of this nature in which the apparent asthenopia was due to long standing disease of the uterus and its adnexa, with reflex of the fifth and optic nerves. The term copiopia hysterica was applied first to this class of cases by Foerster.

M. L. F.

Mydriatic Ozæna.

RHOADS, JOHN NEELY, Philadelphia, Pa. (*Ophthalmology*, July, 1911), reports that he has noted the ozænic odor in 10% of his refraction cases in which he has used mydriatic drops, no odor being present before the instillation. The odor seems to come and go with the mydriatic.

A. F. A.

ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

(GREAT BRITAIN AND THE ENGLISH COLONIES.)

BY

WALTER R. PARKER, M. D.,

DETROIT.

WM. EVANS BRUNER, M. D.,

CLEVELAND.

NELSON M. BLACK, M. D.,

MILWAUKEE.

EDGAR S. THOMSON, M. D.,

NEW YORK.

AND

W. GORDON M. BYERS, M. D.,

\ MONTREAL.

The Operation of Trephining for Glaucoma—Its History, Its Technic, Its Indications, and Its Results.

ELLIOTT, MAJOR R. H. (*The Ophthalmoscope*, August, 1911). The operation for trephining for glaucoma is described in detail, together with its history, indications, and results. The conclusions are drawn from the performance of 403 operations which have been performed at the Madras Clinic during the past two years. The motive of the operation is to reach, to tap, and subconjunctivally to drain the anterior chamber with a minimum of injury to the structure of the eye-ball. To this end the sclera is trephined as far forwards as possible, the ciliary body is avoided, the chamber is entered directly by the trephine, and the iris is dealt with only if it

shows a tendency to block the trephine hole, and so to interfere with filtration. The cardinal rules are few and short, viz.: (1) to dissect the conjunctival flap as far forwards as possible; (2) to apply the trephine as far forwards as possible consistent with the avoidance of injury to the conjunctival flap; and (3) to use a sharp trephine.

Preparation of the Patient.—A patient with acute or subacute glaucoma is admitted to hospital and given a free saline purge; four leeches are applied around the margin of the orbit; a solution of sulphate of eserine is freely instilled, and an opium sleeping draught is administered; fomentations are applied if there is severe pain. Chronic cases are kept in the hospital until the "glaucoma operation day."

On the morning of operation the lids are everted by an assistant and are freely irrigated with a 1/3000 solution of perchlorid of mercury for one or two minutes; a solution of cocain hydrochlorate (4 per cent) is next instilled four times, at two or three minutes' interval, and the patient comes on the table. The operator first expresses the contents of the Meibomian glands by firm digital pressure and then proceeds to swab out the conjunctival sac by the aid of small cotton wool swabs mounted on sticks and carefully steam sterilized beforehand. The swabbing out is done under a stream of sterilized normal saline solution, which is poured in from an aluminum teapot designed for the purpose, and having a long narrow spout. Every recess of the sac is gently but thoroughly cleansed, until all mucus is removed therefrom. Not a single instance of suppuration from the intraocular operation has resulted during the past two years, although the number has been 1,300 operations.

In a great majority of cases local anesthetic is sufficient.

Steps of the Operation.—A large triangular flap of conjunctiva is dissected up from above the cornea. Incision runs roughly concentric with the corneal margin, and ends on each side about 4 mm. below the highest point of the cornea, and the same distance from the inner and outer side of the limbus. It is most essential that this flap be dissected right up to the middle of the conjunctiva. The separation of the conjunctiva from the cornea is now carried to a further stage with the aid of the scissor points. The cornea can be seen to be split. It is very important to keep the points of the scissors directly

towards the plane of the posterior pole of the lens, to avoid button-holing the conjunctival flap. The area selected for the application of the trephines should be carefully cleaned of connective tissue tags.

The spot selected should be as close to the limbus as possible, to avoid the escape of vitreous and to make sure of entering the chamber with the trephine. The trephine is used with quick light movements. Directly the chamber is tapped, aqueous wells up alongside the instrument, and there is a curious sucking sensation, and the patient often indicates the completion of the section by a slight movement, due to the pain (very bearable) inflicted at this moment. A trephine which has proven most satisfactory is that made by Messrs. Weiss, under Mr. Sidney Stephenson's instructions. The author has a trephine of his own design which embodies some improvements suggested by his experience, made by Arnold & Son. The choice in size lies between 1.5 mm. and 2 mm. instruments. Inclination leaning latterly towards the larger size.

Treatment of the Iris.—Should the iris bulge into the aperture, it is snipped with scissors in a radial direction. If it does not go back of itself, then a piece is excised, care being taken to avoid traction.

Toilet of the Wound.—If any tags of iris are seen in the wound, if the pupil has not returned to the central position, or if the chamber fills with blood, then a McKeown's irrigator is used with very satisfactory result.

Closure of the Wound.—It is not necessary in the great majority of cases to employ sutures to keep the conjunctiva in place.

Instillation of Drops.—Instillations immediately after operation are avoided unless the pupil shows an obstinate tendency towards opening, in which case eserine (grains 4 to the ounce) is instilled. On the third day, unless the pupil is already well dilated, and active, a drop of atropin solution is instilled.

After-management of the Patients.—Examination of the eye twenty-four hours after operation almost always finds the chamber refilled and filtration freely established. The tension is very low at first, but gradually rises in most cases. Should the iris tissue prolapse into the trephine hole during convalescence, and should eserine fail to relieve the condition, the conjunctival flap must at once be thrown back, and an excision of the prolapsed portion be undertaken.

A table of analysis of 66 cases which have returned for observation is appended. In six of the cases where the operation was undertaken for the relief of pain only, the vision being nil, the tension was relieved in every case. In 26 cases where the vision was perception of hand movements before the operation, vision remained unaltered in 15 cases; was made distinctly worse in 2; and improved in 9 cases. As far as the tension, one required secondary operation; one was lost by return of glaucoma, and in the rest the tension remained reduced. The period of time between the operation and observation ranged from one to fourteen months. In 10 cases where the vision before the operation was finger counting, 8 showed improvement, the other 2 decrease owing to the maturation of cataract. In 23 cases where the vision before the operation ranged from 2/60 to nearly 6/6, the results as a whole were favorable, especially when it is remembered that the course of glaucoma is towards steadily increasing and inevitable blindness.

W. R. P.

Can Sympathetic Ophthalmia Follow a Nonperforating Traumatism of the Eye?

BUTLER, T. HARRISON (*The Ophthalmoscope*, August, 1911), discusses the question as to whether sympathetic iridocyclitis, both in the exciting and sympathizing eye, can be caused by endogenous infection, or if always the result of ectogenous infection.

The acceptance of the axiom that sympathizing ophthalmia never results from any injury to the eye which does not perforate the globe enables the preservation of many eyes which would otherwise be enucleated.

A case of plastic iridocyclitis is cited, typical of sympathetic infection in which excision was advised, but not pressed, owing to the absence of the perforating wound. No sympathetic ophthalmia has supervened in the two years following the accident.

Fuchs has shown that the inflammation is always of a special character. The inflammation is not the ordinary round-cell infiltration. Those cells are represented by lymphocytes—small, mononuclear, round cells. These cells occur isolated or in nodes which can be seen with a low power, the so-called "patchy infiltration." They appear first in the region of the vessels. They increase in size and surround the vessels.

Nodules coalesce and the inflammation becomes "diffuse." Epithelioid cells are a constant feature; they are derived from the normal cells of the uveal stream, from the endothelium of the vessels, and from the retinal pigment of the uvea. Giant cells are frequent, but not invariable. They are derived from epithelioid cells. Mast cells occur, but not in large numbers. Polynuclear leucocytes are rare. Russel's corpuscles are very frequent. The inflammation is most pronounced in the choroid, which is never exempt. The infiltration in the iris is insignificant and it may escape any inflammation. The ciliary body is always affected, but sometimes to a slight extent. Again, the resolution of the inflammation is quite different from that of ordinary inflammation. There is no suppuration or caseation, but the infiltration organizes in such a way that the uvea is transformed into a dense fibrous membrane.

This same type of inflammation has been found associated with cases of intraocular tumor where there has been no perforation of the globe, and sympathetic ophthalmitis has been excited by it. Th. Leber and Kralnstover in 1892 collected 32 cases of phthisis bulbi, the result of past sarcoma of the choroid, in which 5 developed inflammation of the other eye, which in the light of present knowledge must be regarded as sympathetic in character.

Other literature is reviewed, and a case described, which, if not a true sympathetic ophthalmia, very closely resembles it, following a nonperforating contusion of the other eye.

A woman, aged 25, had 13 years previously, following a blow on the right temple, developed an inflammation of the right eye, the sight was gradually lost. Eleven months later left eye became inflamed and blindness resulted. She had always been short sighted. There was no L. P. in either eye, right iris atrophic and pupil partly dilated. Lens partially dislocated and cataractous, extensive posterior synechiæ. T. = — 1. Left iris bombé, and complete seclusio and oclusio pupillæ, iris atrophic. T. = — 1.5.

Priestley Smith was of the opinion that while the case was suspicious of sympathy, the more likely diagnosis was high myopia; detachment of the retina, iritis later, as usually happens; the same process appearing in the left eye, though without history of injury. Mr. Nimmo Walker believed the case to be one of sympathetic inflammation. He advances the hypothe-

sis that this form of iridocyclitis is due to specific microorganisms, of which the toxins have a special affinity for the uveal tract. Gaining admittance to the body through some lesion, usually by direct inoculation into the ciliary region of the other eye, where of course they are under the most favorable conditions and therefore are most dangerous, but possibly even through any lesion in the body, especially in the alimentary tract, teeth, tonsils, etc., the microorganisms, or their toxins, are carried to the seat of their special activity, the uveal tract of the sympathizing eye.

In the case described the eyes were myopic; a blow on the right temple caused trauma, possibly detachment of the retina, and gave the microorganisms their opportunity, exactly as a slight injury to a point precipitates tuberculosis. The right eye having become a manufactory for the supply of these organisms, in the course of time, 13 years, the left eye became attacked, and in this way was the subject of "sympathetic" inflammation.

Mr. Walker's communication paves the way for the important question: Are we justified in retaining an eye which has become blind from a plastic uveitis following a nonperforating injury, and which may be chronically injected, tender, and soft, or may be in a condition of complete phthisis bulbi? The writer believes that in so doing, a certain degree of risk is encountered and that it is safer to remove such eyes.

W. R. P.

On X-Ray Localization of Ocular Foreign Bodies and Their Extraction from the Vitreous.

HOLTH, S. (*The Ophthalmoscope*, August, 1911), gives a detailed description of his method of localization of intra-ocular foreign bodies and their extraction, accompanied by illustrations of the technic and radiograms.

A small planoconvex leaden button of 2 mm. diameter is fastened by a fine black suture into the conjunctival limbus at the upper and lower ends of the vertical meridian.

The patient, seated in a common chair, fixes his head immovably by biting a metal spatula covered with sterilized gauze and fixed to an apparatus for carrying two photographic plates. He looks at a small object at a distance of two metres at the same height as his eyes, while three or more photographs are taken, two of them bitemporal, the third occipito-

frontal. The Crookes' tube ought in all exposures to lie in the horizontal plane through both eyes, $\frac{1}{2}$ metre from the injured eye.

From the bitemporal exposure the plate lies in the frame of his head-fixing apparatus against the temple of the injured eye, while the Crookes' tube is on the sound side; first in the prolongation of the line connecting the centers of the two eye-balls. When the first plate has been taken, the Crookes' tube is removed 7 centimetres backwards in a sagittal direction for a second temporal exposure.

For the occipitofrontal exposure the Crookes' tube is placed behind the patient's neck in the horizontal sagittal line through the center of the injured eye, while the plate (9 cm. x 12 cm.) is hanging in the feather forceps of the fixing apparatus in an oblique position, close to the orbital border.

During all exposures (temporal and frontal) the patient's face ought to be turned slightly downward, and consequently, the eyes turned slightly upward from the horizontal fixation. By this means the rays from the Crookes' tube at the same height as the eyes pass under the brain during the occipitofrontal exposure.

The distances between the shadow of the buttons and that of the foreign body is measured directly on both plates with a millimeter rule. The dimensions as shown in the plates, exceed by about 10 per cent the real dimensions, because of the distance which separates the buttons and the foreign body from the plate. The measurements are then translated with two ink spots on to the surface of a metal globe of 24 millimeters diameter in which the outlines of the pupil, the limbus, and the two leaden buttons are engraved. Furrows corresponding to the vertical meridians of the eyes, and two horizontal furrows corresponding to the places of the leaden buttons are also marked upon the metal globe.

The position of the foreign body corresponds to the intersection point of three planes imagined through the two ink spots on the localization globe. Through the ink spot corresponding to the measures on the frontal plate is imagined a horizontal plane and a vertical plane in a sagittal position. Through the ink spot corresponding to the measures on the bitemporal plate is imagined a vertical plane in a frontal position.

Foreign bodies near the anteroposterior axis of the eyeball situated up to 20 mm. behind the connecting line between the two leaden buttons must be supposed to be intraocular when the eye is emmetropic. If the foreign body is 24 mm. or more behind the connecting lines, the splinter has pierced the posterior wall of the eyeball.

By a more eccentric position of the foreign body, the corresponding distances will be shorter. In some degrees of hypermetropia and all myopia, the corresponding distances will be 1 mm. shorter or longer for each 3 D. of ametropia.

If the refraction of the injured eye is not known (which is the rule) we must consider the refraction of the other eye, remembering, in doing so, that anisometropia amounting to more than 3 D. is rare.

Immediately before the operation, the surgeon ought to inspect carefully the metal globe with the two ink spots. He will then obtain a very exact notion of the position of the foreign body in the injured eye.

In removal of foreign bodies from the vitreous, a distinction is made between magnetical and nonmagnetical splinters.

When the size and position of the iron splinter are exactly known, the surgeon can make his choice of a portable magnet or a giant magnet beforehand. In the latter case he can choose between extraction from the anterior chamber via the zonula, in certain cases of small splinters, and between extraction through a meridional incision in the sclera, which is the better method when the splinters are larger.

Nonmagnetical foreign bodies are most frequently represented by copper and brass splinters. For their removal Dr. Holth has devised a set of spade forceps of various shapes, which are readily inserted through a keratome incision of the sclera. The anterior end of the incision is generally 10 mm. from the limbus, the posterior end is prolonged backwards with straight scissors 3 to 5 mm.

X-ray photographs of intraocular foreign bodies taken by this method are shown.

One case in which bitemporal plates were taken of two copper splinters, one with the eyes looking downward and the other with the eyes looking upward, after the method of Grossman, it appeared that both splinters moved in a direction opposite to that of the leaden buttons. Upon subsequent enucleation,

however, it was found that both particles had pierced the posterior wall of the eyeball, the lower one lodged in Tenon's capsule and the upper one in the orbital tissue just below the anterior end of the optic nerve. W. R. P.

Acute Iritis.

HARMAN, BISHOP N. (*Lancet*, November 4, 1911). A very graphic description of the structure of the iris is given, followed by an elaborate and detailed report of a case.

The signs of iritis, glaucoma and conjunctivitis are then contrasted. Under causes of acute iritis Harman says: "I propose to say very little on this head, not because there is very little interest in its discussion, but because by so doing I wish to impress upon you the fact that the primary cause of the inflammation has little or no bearing upon the direct treatment of the inflammation. Venereal disease accounts for the majority, possibly 75 per cent, of all cases. Secondary syphilis accounts for fully half. Next in order of frequency come gonorrheal and rheumatic iritis. For the present it is not possible to separate the two. There has always been a conflict of opinion as to how far one or the other of these affections determined iritis. Of the causal relation of gonorrhea to iritis in certain subjects there can be but small room for doubt. Vetch appears to have been the first to have seen what might be called the gonorrheal syndrome. There is his remarkable observation of the liability to the succession in the same subject of gonorrheal urethritis, purulent ophthalmia, arthritis and iritis, an observation which Mackenzie, writing 20 years later, stigmatizes contemptuously as a "notion" and "a good example of a hasty generalization in regard to diseases between which no other relation than that of concurrence has been pointed out." The conclusion of Vetch is sure enough today, at least as far as the urethritis, purulent ophthalmia and arthritis are concerned, only we cannot definitely prove the iritis, for the organism recoverable from each of the others of the syndrome has not been recovered in it.

Rheumatic iritis has been scouted by some. It is remarkable how rarely we see iritis in the subjects of acute rheumatic fever; and never an iritis during its progress or convalescence notwithstanding the frequency of inflammations of other serous membrane. Recently Payne and Poynton have shown

that the injection into rabbits of the micrococcus rheumaticus can produce iritis with exudation into the anterior chamber, and from these cases they have recovered the organism. I have seen some cases of these animal infections produced by other workers, there was no doubt of the iritis, but the massive purulent exudate in the anterior chamber suggested rather a pyemia than an ordinary acute iritis.

Then there remained a residuum of some few cases where iritis has occurred during, or closely after, acute fevers, e. g., malaria, typhoid, influenza, and even mumps, or subsequent to exposure to cold or undue strain. These cases are of milder type than that described above, but they are just as liable to produce synechia and endanger the vision. Of malarial iritis I have seen very few cases.

The treatment the author divides into direct or indirect. Under direct an ointment made up of 2 per cent each of atropin sulphate and cocain with equal parts of lanolin and vaselin is applied every hour for four hours until pupil widely dilated. Later the strength and the frequency of the application may be reduced to 1 per cent, night and morning. Taken at the outset, the worst case of iritis will react to this treatment, and to this alone. In conjunction is used moist heat, leeches and 5 per cent solution of dionin.

Under indirect treatment a smart purge is suggested first, then depending upon the primary cause of the iritis either iodid of mercury or the salicylates.

The use of salvarsan is discussed but the final choice will rest with the patient, to whom the advantages and disadvantages of the proposition must be fairly put. N. M. B.

On Ocular Palsies Occurring as the Sole or Most Conspicuous Objective Evidence of Disease.

HAWTHORNE, C. O. (*The Ophthalmoscope*, November, 1911), while admitting the possibility of many cases of ocular paralysis occurring without clinical association, lays particular stress on the fact that in not a few instances an ocular paralysis is merely the first of a series of events dependent on progressive and serious disease of the central nervous system, and should be entitled to the same respect as hemiplegia, or muscular atrophy, or wristdrop.

There are good clinical reasons for regarding a few cases

as "simple." Just as the facial may recover from a palsy which seems to be due to some local action, and for want of a better word is termed "rheumatic" or "cold." If true of the seventh, there is no reason why it might not be true of the third, fourth or fifth.

In speaking of these simple cases, the author writes as follows: "It seems necessary to admit that an ocular paralysis may be merely 'simple' or 'rheumatic.' The difficulty is to be sure that this is the explanation in any individual case. All that can be said, perhaps, in the way of help in this difficulty is, that if the absence of syphilis can be guaranteed, if there are no other signs of nervous disease, and if the patient is more or less definitely 'rheumatic' (whatever this may mean) it is a reasonable conclusion for practical purposes that the paralysis is of the simple order. Not that this necessarily means that it is to be of brief duration, or that a complete cure is certain. On the contrary, the damaged nerve, more or less extensively, may be permanently injured, and even when complete restoration is secured this may be a matter of weeks or even of months. It is all the more important to remember this, seeing that some of the ocular paralyses associated with central organic disease are but slight in degree and transitory in duration. In other words, it does not follow that because a paralysis is decided and prolonged it is necessarily the forerunner of further symptoms, nor does slightness of paralysis and brevity of duration inevitably indicate that anxiety for the future of the nervous system is wholly gratuitous."

For the most part, the lesion in simple cases of paralysis is confined to either a single nerve or to a branch. This rule is not absolute. Ocular paralyses, then, and even severe and persistent ocular paralyses, may in individual cases be merely the expression of a localized neuritis of the corresponding cranial nerves due to exposure.

Hysteria is rarely, if ever, the cause of ocular palsies of the extrinsic muscles, although hysterical spasm of the orbicularis palpebrarum may simulate a paralytic ptosis. Myasthenia is mentioned as a recognized though uncommon cause of ocular paresis coming on with exhaustion and disappearing with rest,—bilateral and may include the levator and orbicularis. Occasionally sufferers from migraine have with each attack an ocular paralysis and a consequent diplopia, coming

on with each attack; while between the attacks the patient enjoys good health. Tuberculous nodules, tumors, aneurisms, are given as possible causes of recurrent paralyses.

The subject is summed up as follows: It may be said that "simple" ocular paralysis as the result of "cold" or "rheumatism" is a fairly well established condition; that neuritis of the ocular nerves is well recognized; that hysterical ocular paralysis is doubtful or more than doubtful; and that myasthenia and migraine (conditions of uncertain organic significance) may, each in its own fashion, lead to ocular muscular defects.

Of more importance, is the relation between ocular paralysis and the chronic degenerative nervous diseases—chiefly *tabes dorsalis*: for ocular paralysis may be the first evidence of locomotor ataxia, especially if the patient has reached middle life and admits a history of syphilitic infection. The severe cases are as often found in the rheumatic as in the tabetic group. While a bilateral distribution certainly favors the more serious diagnosis, in many cases of *tabes dorsalis* the paralysis is unilateral. However, while a bilateral distribution opposes strongly a "rheumatic" explanation, a unilateral paresis is consistent with either hypothesis.

Ocular paralyses may also be an early manifestation of general paralysis of the insane; disseminated sclerosis, chronic bulbar disease, degeneration of the nerve nuclei and gummatous involvement of the nerve trunks.

Chlorosis may be accompanied by a diplopia dependent on a paralysis of the sixth cranial nerve. Generally such a patient would show a double optic neuritis, with possibly some gastric disturbance resulting in a combination of symptoms suggestive of serious intracranial disease. Exactly how chlorosis leads to this group of symptoms is not known, but the possibility of a thrombosis of some of the intracranial veins and sinuses has been suggested. The important point clinically is to appreciate the fact that a combination of ocular paralysis and double optic neuritis does not necessarily mean serious intracranial disease.

Again, suppurative disease of the middle ear may be the cause of an ocular paralysis, associated with an optic neuritis. "Chlorosis and otitis media, each, at least at first sight, seems far removed from the formula of ocular paralysis as the sole objective evidence of disease. Yet in the clinical history of

each there may appear an ocular paralysis which, in the circumstances may, unless the possibility is appreciated, readily mislead both prognosis and treatment." W. R. P.

The Relation of the Trachoma Bodies to Trachoma, With a Report of Cases.

McKEE, S. HANFORD (*The Ophthalmoscope*, September, 1911). In spite of the bacteriologic advantages of today, trachoma in some forms seems as difficult of diagnosis as it was many years ago, and the subsequent course of the disease alone affords the desired information.

Halberstadter and v. Prowazek, in 1907, found in smear preparations from a trachoma patient, near the nuclei of the epithelial cells, round or oval, dark blue or violet, nonhomogeneous masses. Within these bodies they discovered very sharply defined small granules of a distinctly red color. They also noted irregular masses of blue stain, the reaction product of the cellplastin clots. These small bodies were given the name "Chlamydozoa." The writer reviewed the findings of the various discoveries since that time, and gives a summary of 150 examinations, made at the Montreal General Hospital. The summaries were all prepared, fixed and stained within one hour. Negative results were obtained in three cases of active trachoma.

In one of these cases, examined every day for a week with a negative result, later examination demonstrated the trachoma bodies in the tissue preparations. A striking result was the finding of the trachoma bodies in the normal conjunctiva. In one case of purulent conjunctivitis of four days' standing in a baby 2 weeks old, smear examinations were negative, while culture showed the presence of staphylococcus pyogenes albus and the bacillus xerosis. In order to verify the results of others, prepared smears were stained with Giemsa. The epithelial cells were crowded by masses of trachoma bodies. The whole microscopic picture being a much more exaggerated one than seen in most virulent cases.

The Halberstadter and v. Prowazek trachoma bodies have been found by numerous observers in trachoma, in ophthalmia neonatorum, gonorrheal and abacterial, by a few in catarrhal and purulent conjunctivitis of infants, and by the writer in the normal eye. "They have repeatedly been demonstrated in the

male and female genital organs, to such an extent, in fact, that Herzog would have us believe that gonococci involuted or changed in some other way are the producers of a disease as severe as true trachoma. What the trachoma bodies are, only further unbiased research may show. In the light of our present knowledge do they not seem to represent more the reaction of these different mucous membranes to some virus, rather than the etiological factor in trachoma? 'For the present we must consider it doubtful whether these granules are parasitic in nature or not, and further research is necessary before we can say whether they occur so regularly in trachoma that they can be considered of diagnostic value.' This remark was penned by Axenfeld in 1908. It seems that 1910 finds the question in statu quo."

W. R. P.

The Treatment of Trachoma.

LEA, J. AUGUSTUS (*The Ophthalmoscope*, September, 1911). The method of treating trachoma, with which the writer has had great success is described:

After washing out the conjunctival sac with boric acid solution and instilling a drop of coadrenaline, the true granulations were carefully pricked with a tattooing needle dipped in acetic acid, and again washed with boric acid solution. A 25 per cent solution of argyrol is applied with a smooth glass rod, as it seems to relieve the irritation. This treatment if a weak solution of cocain is used before pricking, is practically painless, and as the true granulations are insensitive and soft, the granulations are pricked every 3 or 4 days, but the irritation is so slight, that it may be done every second day. For home treatment a solution of cyanid of mercury 1/4000 is ordered to be used freely twice daily. As a rule, the papillary granulations subside as the true granulations disappear. If not, a few applications of the nitrate of silver, or a few light touches with copper sulphate will cause them to disappear.

A brief history is given of some of the recent cases which have been successfully treated by this method.

One case, a young man, was treated by the writer for trachoma 15 years ago, at which time he had pannus, and so much alteration of the cornea, that he was practically blind. After several months' treatment with acetic acid, at first at short intervals, afterwards at longer intervals, followed by

slight applications of sulphate of copper, the granulations disappeared, the cornea cleared, and his eyes became quite well, and at present both conjunctiva are perfectly smooth and natural, and the cornea quite clear.

The finding of trachoma bodies deep in the tissues, their disappearance from the surface on treatment, their reappearance at once when the treatment is stopped, explains what has frequently been observed in patients suffering from trachoma; that their symptoms are relieved, that the disease is checked by almost any antiseptic application, such as cyanid of mercury, but is not cured. To cure the disease, it seems necessary to carry the destroying agent more deeply into the tissue; at the same time, using a weak antiseptic application to destroy the bodies coming to the surface.

One case of spring catarrh, treated by the same method subsided after 5 months' treatment, and has remained well since.

W. R. P.

The Treatment of Purulent Keratitis by Zinc Iontophoresis.

TRAQUAIR, H. M. (*Ophth. Rev.*, January, 1911). The current passes through a rheostat, current reverser and milliamperere meter to a pair of terminals, which are connected by flexible rheophores to the electrodes. There is also a small clock to time the application.

The indifferent electrode consists of a small piece of zinc which may be put into a basin of salt solution in which the patient places one hand, or may be applied to any convenient skin surface, wrapped in lint moistened in salt solution.

The active or corneal electrode consists of a rod of pure zinc bent at an angle of about 130° and shaped at one end so as to fit into a small celluloid cap, which has an orifice at its distal end of about 1.5 mm. diameter. The other end of the zinc rod screws into a handle consisting of a copper conductor encased in celluloid to the center of which the rheophore is attached. The celluloid cap is filled with cotton wool which projects slightly from its distal orifice. It is then moistened with a 0.5 per cent solution of zinc sulphate and fitted on to the zinc rod, the end of which is kept polished.

A second rod of zinc, conveniently bent and sharpened, may be screwed into the other end of the handle.

1. Although special apparatus is required, the technic is very simple.

2. An electrode 1.5 mm. in diameter and shaped like a thermocautery is very convenient. With this size a dose of 1.5 minutes is enough.

3. Care should be taken to treat thoroughly every portion of the advancing edge of the ulcer.

4. The difficult parts to treat are those where the undermining is very deep and the overhanging tissue thick and tough, and the infected foci, sometimes seen, which project like buds deeply into the cornea. These spots should be scraped with the zinc point with a dose not above 0.5 ma. for 0.5 minutes.

5. Generally speaking the smallest efficient dose should always be used.

6. When the process is not checked it is because the causal organisms have not been properly got at, not because they have proved resistant.

7. Pain may occur, either immediately following the application or some days afterwards, in this case due to iritis. Eucain ointment for the former and atropin for the latter have proved successful remedies. Only in exceptional cases is the treatment followed by severe pain.

8. The method is certainly efficient for mild and moderately severe ulcers.

9. More experience is required before it can be said that zinc iontophoresis is an unfailing remedy in severe cases. It has certainly produced results as good as, or better than might have been expected from the cautery in those severe cases in which it has been used. With or without paracentesis it would appear to be suitable for those advanced cases in which the condition of the cornea renders cauterization inadvisable.

10. The eye may remain red for a longer time than usual after the ulcer is healed, but this circumstance does not indicate any serious condition, and may be neglected.

11. The healthy corneal tissue adjoining the ulcer is not destroyed as it is by the cautery, with the result that thinner and less extensive scars are produced.

12. As far as can be judged from the evidence to hand, the average vision obtained is superior to that following cauterization.

N. M. B.

Treatment of Lacrimal Suppurative Disease.

FERGUS, A. F. (*Ophth. Rev.*, August, 1911). The author condemns the destruction of the canaliculus and gives us the following analogy:

Even if we admit the pathology, hitherto all but universally accepted, that dacryocystitis is essentially due to an obstruction at the point where the lacrimal sac enters the nasal duct the proceeding seems to us irrational. It cannot affect the stricture one way or the other. To carry an analogy to another organ, nobody has ever proposed to slit it up from its external meatus right to its membranous portion for the purpose of overcoming a stricture in that part, yet it is quite as justifiable to perform the one operation as the other. The *fons et origo mali* is not a stricture, but is a septic condition of the mucous membrane of the lacrimal sac and duct, and if a stricture does develop it is due to the swelling consequent on the formation of the septic condition obliterating the passage between the sac and the duct. Given an infection of the lacrimal passages by such organisms as the pneumococcus, streptococcus and pus-cocci there is no reason why the restoration of an opening between the sac and the duct should cause the microorganisms to leave the mucous membrane in which they are implanted. Hence the repeated failures to obtain a permanent cure by the mere passing of probes and hence also the necessity of adopting other means for the relief of an annoying malady.

Irrigation of the lacrimal sac associated with probing is justifiable treatment, the chief objection to it is that it must be continued for a long period of time before a permanent or satisfactory cure can be obtained. One variation of the method of treatment by probes must be mentioned, and that is the habitual wearing of a style in the lacrimal passages so as to prevent the reformation of the stricture after it has been forced by a probe or divided by a knife.

The plain fact that many individuals have gone about for years with metal wires composed of silver or tin or lead constantly in their lacrimal passages seems conclusive evidence that the method of treatment is not curative; neither should it be; it is based on the erroneous idea that the condition is due to stricture and not to a septic mucous membrane.

When once the idea of a septic mucous membrane becomes

the prevailing one in the mind of a surgeon, such instruments will find in his hands very little serviceable employment.

The use of caustics for irrigation or probing may be useful but, in the first place, it must be remembered that a good deal of the caustic solution will find its way from the nares into the stomach, and consequently care must be taken in the caustics selected, for it is within the range of the possible that toxic effects may be produced. In the second place, apart from poisonous effects, the action of the caustic may be most injurious.

As to electrolysis, personally we have never tried this remedy nor are we acquainted with the work of any surgeon who has extensively employed it. It is not quite apparent what effect, if any, electrolytic action may have in destroying micro-organic life.

So far as our observations go there is no plan of treatment at all comparable with the radical one of the removal of the lacrimal sac. In our own practice that is the line of treatment all but invariably recommended to a patient. It is the most efficient of all and does not require the long lapse of months or even years before a permanent cure is obtained which the method of treatment by probing all but invariably does.

The absence of excessive lacrimation after removal of the sac is explained as follows:

It seems to us that it may well be argued that the lacrimal gland has little to do with the lubrication of the eye; in other words, the tears are only rarely secreted in anything like a copious flow. Our proposition is that the lacrimal secretion only takes place in response to definite stimuli, either emotional or mechanical, and amongst the latter must be classed the irritation caused by a supporting sac. The ordinary lubrication of the eyeball and eyelids would seem to be due to the glands which are situated at the upper portion of the posterior surface of the eyelid, namely, the glands of Krause.

N. M. B.

Acute Plastic Iritis Markedly Benefited With Antistreptococcus Serum.

BRADBURNE, A. A. (*Lancet*, September 23, 1911), reports a case of acute plastic iritis in the left eye of an individual with symptoms resembling rheumatism in which atropin, cocaine, dionin and salicylates had not made any impression.

Examination of the patient's teeth revealed the presence of suppuration around the roots, and this feature led to the conclusion that the condition was due to a staphylococcal or streptococcal toxemia. The right eye then became involved. Blood examination confirmed the view that the condition was streptococcal in origin, and upon this it was decided to inoculate with antistreptococcus serum. At 1 p. m. an injection of 10 cc. of Messrs. Parke, Davis and Co.'s antistreptococcus serum (polyvalent) was given. At 3 p. m. the temperature went up to 99° F., and patient complained of itching of his left eye. At 7 p. m. the eye became more injected. This evidence of local reaction was particularly pleasing, and when he was seen next morning it was found that the deposit of lymph on the lens of the right eye had completely gone, and the liquefaction of the exudation had enabled the atropin to start dilation of the pupils. At the same time the texture of the iris became evident, its markings having previously been obscured by lymph.

Forty-eight hours after the injection the right pupil became fully dilated and the left to three-quarters. In the left eye a curious condition was to be seen. Extending from the cornea to the anterior surface of the lens was a cone shaped solid semitransparent mass, bearing a striking likeness to a lump of camphor. Its broad expanded base was attached to the posterior surface of the cornea; its apex, resting on the lens capsule, corresponded to the size of the originally contracted pupil. As matters progressed this mass rapidly melted away and in four days all that was left was a centrally situated nodule, surrounded by a series of concentric rings slightly colored with iris pigment.

This case seems to show that certain antitoxic serums, even if they do not possess specific action, have marked therapeutic properties of liquefying and aiding absorption of the exuded lymph. Whether the good results were in any way due to the previous use of the salicylates or not this one case cannot prove. It, however, proves the utility of antitoxic sera, as without it the case could scarcely have made such rapid and astonishing progress. Another question which seems of interest is whether the case was really one of the manifestations of so-called rheumatism of streptococcal nature. The fact that the salicylates relieved the intense pain seems to support this idea.

N. M. B.

Orbital Skiagraphy, With Reference to Its Limitations and Technic.

BOXER, ERNEST (*The Ophthalmoscope*, August, 1911). After calling attention to the limitations of orbital skiagraphy owing to the inefficiency of the rays in localizing substances which are not shadow producing, the writer describes in detail the technic employed.

A twelve or fourteen inch coil is used with an exposure of about 3 minutes with 5 to 6 m. a. of current. The tube is approached as near as $2\frac{1}{2}$ inches to the cheek. A small diaphragm is used. The plate is held firmly to the head in a plate holder by means of elastic straps.

The center of the anticathode is advanced to within $\frac{1}{2}$ inch to $\frac{3}{4}$ inch in front of the opposite malar bone, so that the rays are somewhat looking into the orbit, which prevents the shadow of the near molar overlapping the shadow of the distant one.

There are two methods of localization. The complex method is the stereoscopic and is described and diagrammed in detail.

The simple method, preferred by the author, is to make but one exposure working always from the same known relative position of anticathode to the eye and plate.

Should the shadow be very sharply defined, it is invariably nearer the plate, i. e., in one or other of the outer segments of the eye; if somewhat indistinct and hazy, then it is in the inner half of the eye.

With regard to foreign bodies within the orbit and not inside the eye, reliance may be placed on the method before indicated of taking two half exposures upon the same plate, with the eye in extreme elevation and depression alternately, the absence of a double shadow indicating that the body is in the orbit, although not in the eye.

The position of the shadow of the foreign body relative to the surrounding bony shadow is nearly always sufficient to show where it lies, especially when the foreign body lies very far back in the orbit, say, in the periorbital fat. There is very little use in localizing a foreign body in the orbit, because the wound of ingress is sufficient to say whether the foreign body is to the nasal or malar side of the eye, and then the shadow is so distinctive in its relation to the bony shadows that no mistake can be made.

W. R. P.

On the Use of Lacrimal Styles.

SMITH, PRIESTLY (*Ophth. Rev.*, September, 1911). A few years ago it was customary to destroy the lacrimal sac for mucocele and chronic dacryocystitis only in cases which were incurable by other means. At present some leading ophthalmic surgeons advocate this procedure in a large majority of cases.

If the only alternative were the frequent and continued use of probes I would venture no criticism. Destruction of the tears passage is, no doubt, the right treatment in certain cases; perhaps some of my own would have been better treated in that way; but that it is now often carried out where restoration of the passage and real cure could be effected without much difficulty, I feel confident.

The styles I use are made from pure (not commercial) silver wire, well annealed, i. e., softened by heat after it is drawn. They are of three thicknesses, approximately 1.3, 1.5, and 1.7 mm. The thickest are seldom wanted. In each thickness they are of four lengths, 35, 40, 45, and 50 mm. The longest are needed only when it is necessary, for a short time, to let the crook lie outside the lower lid instead of in the canaliculus. The ends are smoothly rounded. They are kept ready for use in glass tubes and so kept do not become tarnished. They are bent to the necessary shape at the time of using by means of the bending-ring. This is better than pincers because it does not scratch the silver. They are soft enough to be bent by the finger but can be shaped more accurately by means of the ring.

A few leaden probes are wanted for ascertaining the length and shape of the duct. At one time I made my styles of lead wire: they adapted themselves easily to the shape of the passage, but they sometimes broke at the bend and often became misshapen by finger pressure. Silver styles never break.

The insertion of a style is an operation requiring deliberate and delicate manipulation. The more slowly the several steps are effected, the less pain there will be. Unless the parts are acutely inflamed and tender it may usually be completed at the first visit.

The steps of the operation and method of procedure are then described. According to circumstances, a style may be worn for a few weeks or for many months. If tightly gripped

at first it becomes loose in a short time. So long as watering and discharge continue it should be removed occasionally, cleaned, and reinserted, or replaced by a thicker one. Being unseen and unfelt, it is sometimes practically forgotten and worn much longer than necessary—even for years. Too long wearing of a style may keep up a slight discharge which ceases when it is removed. In a few instances the style had disappeared into the sac and it was necessary to enlarge the opening into the sac for its removal. This can only happen when the sac is large and the crook too short. In treating a much distended sac it is well to let the upper end of the style turn down over the cheek for a week or two, until the cavity has contracted. In one of my early cases a style with a short crook disappeared and came out through the nostril two years later, having given very little trouble. With due care the style never passes out of reach.

Whether these restored passages are bacteriologically as healthy as those which have never been obstructed is an important question. For a while at least one would regard them with suspicion in view of cataract operation, and an examination of the conjunctiva would be especially desirable. But as regards the usual signs of lacrimal disorder and the patient's satisfaction they are often all that can be desired. N. M. B.

The Relation of the Lacrimal Fossa to the Ethmoidal Cells.

WHITNALL, S. E. (*Ophth. Rev.*, November, 1911). The "lacrimal ethmoidal cells" which come into relation with the lacrimal fossa belong to the group of anterior ethmoidal cells: their walls are completed by the lacrimal and frontal bones, and, in addition often by the frontal process of the maxilla: when well developed they may enclose the lacrimal fossa on its anterior and medial as well as posterior aspects: they open into the ethmoidal infundibulum. The anterior ethmoidal cells, whilst primarily confined to the lateral ethmoidal mass, very often extend into the body of the middle turbinated bone, the superior part of the uncinate process of the ethmoid bone, and the agger nasi (the ridge at the superior extremity of the uncinate process of the maxilla with which the anterior extremity of the middle turbinated bone articulates). A cell in this last situation, at the superior extremity of the uncinate

process of the ethmoid bone (the cell of the agger nasi), has been found very frequently related to the lacrimal fossa.

The above general account of the relations has been given by, amongst others, Stanculeanu, Rollet, Aubaret and Bonnefon, and J. B. Schaeffer. Thorsch (*Klin. Monatsb. f. Augenheilk.*, 1909, viii, p. 530) gives a more detailed account of sections through the medial wall of the lacrimal fossa. In 82 skulls the nasal fossa was opened into in 65 instances, whilst of the remainder, in 14 cases he opened partly into an ethmoidal cell and anteriorly into the nasal fossa.

The precise relations between the anterior ethmoidal cells and the lacrimal fossa becomes of importance in consideration of the above emphasized difference in thickness between the wall of the anterior half of the fossa formed by the frontal process of the maxilla and that of the posterior part formed by the lacrimal bone—a difference strongly marked even when the frontal process as well as the lacrimal bone is undermined by cells. He concludes that in 80 per cent of cases the lower part of the medial wall of the lacrimal fossa bears no relation to the ethmoidal cells, but that through it one could pass directly into the nasal fossa.

In one hundred skulls examined, approximately the inferior half of the lacrimal fossa was found in every case related solely to the anterior part of the middle nasal fossa, which could easily be entered through the thin posterior portion of this area formed by the lacrimal bone, whilst the superior half of the lacrimal fossa presented relations to an anterior ethmoidal cell which extended (1) to the posterior wall of the fossa in 14 cases; (2) as far forwards as the center of the medial wall in 32 instances; (3) completely across behind the fossa in 54 cases. Thus the thin posterior lacrimal portion of the upper half of the fossa was related to an ethmoidal cell to a varying extent in every case. There was in most cases a single ethmoidal cell situated in the anterior extremity of the uncinate process of the ethmoid bone, in the region of the agger nasi. This cell opened into the ethmoidal infundibulum. The difference in strength between the anterior half of the lacrimal fossa formed by the stout frontal process of the maxilla and the posterior half formed by the delicate lacrimal bone was pronounced even when the former was also undermined by ethmoidal cells.

N. M. B.

A New Operation for Extirpation of the Lacrimal Sac.

BUTLER, T. HARRISON (*The Ophthalmoscope*, September, 1911). The methods of Muller's process for extirpation of the lacrimal sac is mentioned and the following procedure suggested as a modification:

By a single insertion of the needle, half a syringe of "Codrenine" is injected, first under the skin, and then under and around the sac. An incision is first made through the skin alone. An imaginary vertical line is drawn through the inner canthus about 12 mm. long, and on this, using the canthus as a center, a complete semicircle is made with a knife. This marks out the flap which must be reflected outwards by careful dissection to separate the skin from the internal palpebral ligament. Carelessness will result in a button-hole, which is a serious complication. A suture is then passed through the flap and given to the nurse to hold. Another suture is passed through the nasal lip of the wound and given to a second assistant to hold. Care should be taken not to undermine the nasal lip, for on this side lie all the veins which may cause troublesome bleeding.

The field is now fully displayed and no retractors are necessary.

The ligament is now dissected out, which is done by a few strokes of the knife made from the nose outward, to avoid wounding any small veins. A silk thread is passed under the tendon and the nurse draws it downward. The fibres of the orbicularis muscle arise from the palpebral ligament, and have been dissected away from the superficial fascia. Some fibres seem to lie under the ligament; these must be pressed outwards and inwards by blunt dissection, and expose the deep fascia.

The deep fascia must be split vertically with knife or scissors and the sac exposed. The sac is then freed from its attachment above with a knife and seized with a pair of tenaculum forceps and separated from the lacrimal fossa with squint scissors whose points must be constantly kept close to the bone. This dissection, which removes the periosteum as well as the sac, must be continued down to the palpebral ligament. With the nurse making tension on the skin flap and sac, we now dissect away the fascia, which limits the orbit, and gradually isolate the upper half. The next step is to pass the sac under

the palpebral ligament drawn upward by its suture. Now both canaliculi are divided and the sac is dissected free down to the duct with scissors. When it is free, it is twisted round and round to separate the duct from its bony surface, and cut off with scissors as low down as possible. The skin wound is united by three horse-hair sutures and firmly bandaged with a ball of wool sewn up in gauze into the hollow between nose and eye, so that the cavity may be obliterated. The dressings are frequently renewed to keep up the pressure and the suture removed on the fourth day.

The wound almost invariably heals by first intention, and in a few weeks becomes almost invisible.

Epiphora is unusual.

The operation described is not suitable for cases where there has been phlegmon. In such cases, an almost straight incision is best, and it is wiser to sacrifice the ligament. Drooping of the lid is caused by too freely dissecting away the fibres of the orbicularis muscle. It is often extremely difficult to separate the sac externally without button-holing the conjunctiva just under the caruncle. A suture, however, suffices to close the conjunctival sac and no harm happens. He has performed the operation in from 70 to 80 cases with good results, the operation being almost painless and generally bloodless.

W. R. P.

A Convenient Method to Test the Visual Fields for Color Without the Use of a Perimeter.

WILLIAMS, F. A. (*Lancet*, August 19, 1911). It was formerly supposed that inversion of the visual fields for blue and red was pathognomonic of hysteria, especially when a contraction of the field for form was present in addition. Not everyone is yet acquainted with the work of Babinski which has clearly shown that the perimetric examinations of hysterical patients as ordinarily conducted are redolent of suggestions, and that these very often influence the patient, so that the findings are not reliable except as indices of suggestibility. Thus there is no characteristic visual-field type in hysteria. But there are certain affections in which the visual field is characteristically inverted or interlaced. This happens whenever the intracranial tension is increased to the point where there is an interference with the functions of the neurons which conduct visual impressions. This manifests most particularly, clinically

speaking, towards the periphery of the retina where the sensibility is feeblest; so that as Bordley and Cushing have shown the red is perceived even sooner than the blue on approaching the center of the visual field of cases where the intracranial tension is increased by edema of the brain, whether this is produced by a tumor within the cranium, by hemorrhage therein, or by some constitutional condition resulting from chronic nephritis, diabetes, or other modification of the blood.

To measure this inversion or interlacement of the color fields accurately a perimeter is, of course, required, but I have found that the inversion may be ascertained roughly by the following method: The patient sits with his back to a good light looking fixedly at a point in the distance. He is directed to signal as soon as he sees any movement. The visual field is then approached by the observer's hand, which holds alongside and parallel two objects colored of an intense pure, bright red and blue respectively. After the patient signals, he is asked to signal again as soon as he perceives any color while the center of the field is very slowly approached. The observer then stops the movement and asks what color is seen. To corroborate, the movement is then continued until the other color is seen. In normal persons blue is always seen before red. If this is not the case increased tension may be suspected. In two recent cases, one of tumor and one of albuminuric retinitis, this method has been as positive as that with the perimeter.

If the technic is carefully performed, the test is quite a reliable one and is a useful addition to clinical methods. Indeed, Cushing believes that when inversion of visual fields appears in the case of a tumor, operation should not be further delayed.

N. M. B.

A Case of Exudative Retinitis.

COATS, GEORGE (*Ophth. Rev.*, October, 1911). This case under observation from 1894 until 1910 is reported in full with sketches of the fundus showing the variation in amount and position of the exudate.

The special value of the case lies in the long period over which it was under careful observation. The slow evolution of the fundus changes during nearly sixteen years—never altogether quiescent, yet scarcely progressing; the melting away of exudation in one place and its appearance in another; the

confluence of spots into areas and the breaking up of areas into spots; all these things are in the highest degree characteristic of this disease, and form a picture not to be mistaken for any other. The appearance of the exudation was quite typical. The constant association with retinal hemorrhage is of great interest, and confirms very strongly the view, derived both from clinical and pathological considerations, that the disease is hemorrhagic in origin, and due to the extravasation of blood in the outer layers of the retina. The final slow degeneration of the eye and the occurrence of detachment, posterior cortical cataract, band opacity, a posterior synechia and diminished tension also fit into the picture.

Among minor points in which this case conforms well with the average type may be mentioned its commencement in a comparatively young man (somewhat older than usual, however), and the total absence of any discoverable general affection which might cause the eye condition. Its occurrence in a male, and in the right eye is in accordance with the majority of the reported cases.

N. M. B.

Intraocular Infection by the Klebs-Loeffler Bacillus.

HARRY, PHILIP A. (*The Ophthalmoscope*, October, 1911). The author reports a case of Klebs-Löffler bacillus infection following cataract extraction. The patient, a female aged 70, had been in the hospital two months previously when two cysts of Moll's glands were removed. The left lens was extracted in the usual way. All the usual precautions were taken and the operation was without accident. At the first dressing on the following morning, a mucopurulent discharge soaking the pad and welling out from between the lids was found. The lips of the wound were swollen. No hypopyon present, although a yellowish exudate of lymph filled the coloboma and upper part of the pupil. The infection was localized to the immediate vicinity of the wound. After two weeks the patient began to complain of supraorbital pain, the eyeball was painful to touch, and perception of light disappeared. The upper part of cornea was sloughing. One week later the eye was eviscerated. Portions of the cornea and vitreous as well as some secretion from both conjunctival sacs, were examined with the following result:

(a) The culture from the cornea gives a growth of diphtheroid bacilli.

(b) 'That from the vitreous is sterile after twenty-four hours' growth.

(c) The culture on serum of the pus from the right conjunctival sac gives a growth of a large number of Hoffman's, with a few Klebs-Löffler bacilli.

In conclusion, the author gives the following as the interesting features of the case:

1. The absence of marked conjunctivitis before the first operation.

2. The rapid increase of virulence after the eyes were padded.

3. The absence of infection of the vitreous, which, as a rule affords such excellent pabulum for invading organisms.

4. The total absence of systemic disturbance, and the limitation of the intraocular infection to the vicinity of the wound.

5. The persistence of the conjunctivitis and the character of the secretion which was never membranous.

W. R. P.

The Discrimination of Color.

EDRIDGE-GREEN, F. W. (*Lancet*, August 19, 1911), has stated that if a portion of the spectrum be isolated it will appear monochromatic, the length of the monochromatic region varying with the intensity and wave length of the light and the color perception of the observer. Most normal sighted persons make about 18 such divisions in a bright spectrum.

In a paper in the Proceedings of the Royal Society, Lord Rayleigh, whilst agreeing that the facts were as I stated in the conditions described by me, expressed the opinion that he could distinguish between the wave lengths included in a monochromatic division to the extent of discriminating between the colors of the two D lines. Lord Rayleigh kindly lent me the color box with which he had made the experiments, and, on repeating them in the manner described by him, I arrived at similar results. I hope, however, to be able to show that the results obtained by Lord Rayleigh were due to the admixture of small quantities of white and colored light and to certain physiological influences which had not been taken into consideration, and which prevented him from arriving at a correct interpretation of the colors.

If a prism, even of the finest polish, be examined with a strong light against a dark background, numerous small par-

ticles and irregularities of the surface, which irregularly disperse the light, will be seen. The reflections from the sides of the prisms, lenses and sides of the box have also to be taken into consideration. The amount of this irregularly dispersed light is small, but is a very important factor taken in conjunction with other facts. It is necessary, therefore, in order to get rid of the greater part of this irregularly dispersed light to allow the light included in a monochromatic region to pass through a second aperture, such as that in my spectrometer. When this is done I have found it impossible by any method which I have adopted to distinguish between the various waves included in the monochromatic region.

The importance of the irregularly dispersed light in association with contrast in dealing with questions of color has been overlooked by many physicists, as several instruments have been constructed for the investigation of color and color-vision which are defective on this ground. It was this irregularly dispersed light, as shown by Helmholtz, which caused the apparent change in the colors of the spectrum observed by Brewster, and which led him to suppose erroneously that there were three kinds of solar light. N. M. B.

Cilioretinal and Other Anomalous Retinal Vessels.

JACKSON, E. (*Ophth. Rev.*, October, 1911). The ophthalmoscopic examination of 500 patients (1,000 eyes), presenting consecutively in private practice, has yielded the facts herewith presented. The notes and diagrams were made at the time of examination, and the latter usually verified by looking again into the eye.

To determine whether a particular vessel were an artery or a vein, I have relied upon observing whether it crossed venous or arterial branches. Arteries cross veins, and veins cross arteries. But in the retina I have never observed two arteries crossing each other or two veins crossing each other, except as they may wind over each other at the optic disk, before passing to their areas of distribution. Certainly the test is practically reliable in this connection. Some such test is necessary because many of the cilioretinal vessels are so small that we cannot tell by color whether they are arteries or veins.

Cilioretinal veins are quite rare as compared with arteries.

But perhaps systematic search might show them less rare than we have supposed. This series includes two cases.

Cilioretinal arteries were found in about 20 per cent of all eyes examined. Including the three eyes mentioned above, they were found in 191 eyes, 19.1 per cent. In addition to these there were 40 eyes which presented vessels so completely isolated from the branches of the central retinal vessels, as to make it probable that they arose from ciliary arteries; yet they might possibly have branched deeply from the central retinal artery.

Then follows a description of the typical form of the vessels together with their course and distribution.

A general impression previously obtained, that in normal conditions visible pulsation is more frequent in cilioretinal arteries of equal size, than in the branches of the central retinal artery, has been confirmed by this statistical study.

Three especially anomalous arrangements are then described.
N. M. B.

The Ophthalmic Reaction of Calmette in the Early Diagnosis of Phthisis.

HOSFORD, A. S. (*Lancet*, October 14, 1911). Out of 225 cases in which Calmette's reaction has been tried, 100 were cases of pulmonary tuberculosis which all reacted with the exception of seven. These seven were undoubted phthisis, the sputum containing tubercle bacilli. Five of these seven were in an advanced condition; two of these five gave a reaction to a subcutaneous injection of Koch's old tuberculin. The remaining two cases were early, and, as I have stated above, their sputum contained tubercle bacilli.

Of the remaining 125 cases which were not phthisis, and so did not give the test, 25 were cardiac cases of all varieties; 31 were simple bronchitis which cleared up; 20 were chronic bronchitis and emphysema, 23 were of various kinds, e. g., gastric ulcer, dyspepsia, enteric fever, empyemata, neuroses; 8 were bronchiectases; 6 were simple pleuritic effusion of pneumococcal origin; and 12 were cases of lobar pneumonia all of which resolved. In all these 125 cases tubercle bacilli, although repeatedly looked for, were found to be absent from the sputum, and also from the six cases of simple pleuritic effusion.

Conclusions.—1. A negative result by no means excluded pulmonary tuberculosis. Some very advanced cases failed to

give a reaction. 2. I have never obtained a positive result except in true cases. 3. I never saw any bad results whatever from the use of the test as regards the eye. 4. If a patient in a suspicious case fails to give a reaction, then the test should be applied on three different occasions, with an interval between each application of from three to four weeks.

N. M. B.

On Epiphora After Excision of the Lacrimal Sac.

HARMAN, N. B. (*Ophth. Rev.*, November, 1911). Continued epiphora after incision of the lacrimal sac is not very common, notes of a case in which it occurred, and the ascertained cause of the trouble may be of interest.

The patient was a young woman of 20 years, whose left lacrimal sac I removed in February, 1909, on account of purulent mucocele with complete bony obstruction of the duct. The trouble had followed an attack of facial and orbital cellulitis, set up by dental abscess.

Operation was uneventful and the wound healed in four days. There was no subsequent trouble at the site of the excised sac, and in a month the scar was so delicate that it could only be distinguished when the skin was reddened by friction. Notwithstanding, the girl said that the epiphora was as bad as before operation, and that the continual dropping of tears seriously interfered with her work, that of seamstress. She also said there was discharge at the corner of the eye when she awoke in the morning. A fine probe passed into the punctum entered the canaliculus to the depth of 4 mm., the little tube was blind, no passage could be found. It was considered that this small test-tube-like remnant of the upper canaliculus was the cause of the trouble, that mucus collected within it, microorganisms bred therein, and their occasional invasion of the conjunctiva kept up a constant irritation and hence an epiphora.

The canaliculus was slit up with a Weber's knife, one lip of the wound cut off with scissors, and to make sure of total destruction the mucous membrane was burned with a hot wire.

The girl has been seen on several occasions during the 18 months succeeding the date of that small operation, and there has been a complete cessation of the epiphora. The left eye is no more tearful than the normal right eye, except in the face of cold easterly winds.

N. M. B.

A Case of Ethmoidal Mucocoele.

McMILLAN, A. L. (*Ophth. Rev.*, January, 1911), reports a case in a young woman who complained of the presence of a small swelling in the right orbit, situated at the inner canthus, just above the internal palpebral ligament. It resembled a dilated lacrimal sac displaced upwards, was elastic to the touch but not tender, evidently closely adherent to the tissue beneath. Fluid was not expressed from the puncta, nor could the swelling be obliterated by pressure. Subsequent to the operation it was elicited that headaches had been rather troublesome in the past, but beyond this there were no other symptoms present. At the operation the lacrimal sac was found adherent to a polypoid mass emerging from the ethmoid cells.

The diagnosis was that of a mucocoele involving the ethmoidal cells and possibly the sphenoidal sinus, causing pressure absorption in part of the ethmoidal plate and lacrimal bone in the orbital cavity, and pressing the lacrimal sac forwards and upwards out of its normal position. Rhinoscopic examination was unable to detect anything abnormal in the nasal passages, so far as could be seen without removal of the middle turbinal.

There were no more headaches. On the 16th of April, 1910, Dr. Robert Fullerton, of Glasgow, published in the *British Medical Journal* three cases of mucocoele in the nasal sinuses with optic neuritis as a complication. In all these the symptoms were much more pronounced by way of proptosis of the eyeball, or in more definite nasal symptoms.

The case is reported to draw further notice to the close relationship between the nasal sinuses and the orbital cavity, and to the difficulty of diagnosis in such cases. N. M. B.

Notes on the Extraction of Cataract.

EASON, H. L. (*Lancet*, July 29, 1911). The routine operation for the extraction of cataract has not yet been generally agreed upon, and adherents of one or other of the well recognized methods still claim the superiority of their own choice above all others.

It has long been recognized that success does not follow equally all operations for the extraction of cataract, however uniformly and skillfully they have been performed, and as the ultimate result of an extraction will depend upon the presence or absence of various important sequelæ, it will be probably

more profitable to consider these first, and the various methods of operation later.

These sequelæ are considered under the following heads:

1. Adhesions of the lens capsule to the extraction scar.
2. Capsular opacities.
3. Loss of vitreous.
4. Prolaps of the iris.

The variations in the structure of cataracts is next taken up, followed by the operations, i. e.:

1. Simple extraction.
2. Extraction with iridectomy.
3. Extraction of the lens in the capsule.

The favorable features of each are considered and the ultimate vision compared; and ends by saying:

It appears, therefore, that the extraction of the lens in its capsule is not yet being universally adopted as a routine operation for the extraction of cataract, and that it has been tried and rejected by many skillful operators as being too risky, and in view of the other facts quoted here it cannot be said that the results of extraction of cataract performed in the old way are unsatisfactory.

N. M. B.

The Theory of Skiascopy With the "Scissors" Movements.

ALEXANDER, G. F. (*Ophth. Rev.*, September, 1911). In a long technical article which it is impossible to abstract, the author deals with the difficulties in elucidating the phenomena met with in skiascopy which may be said chiefly to arise from: 1st, basing the form of the luminosity apparent to the observer upon that which the image of the source of light assumes on the fundus of the observed eye, i. e., upon that of the area of its fundus which is illuminated; 2nd, ascribing the rate of movement of the shadow to its variation as the size of the image of this area seen by the observer, and 3rd, attributing the faint shadow to the observer's vision of the faintly illuminated border of the image of the source of light given by the circles of diffusion in the fundus of the observed eye.

The article must be read in the original as the diagrams and formula contained are necessary for a full understanding of the subject.

N. M. B.

Two Cases of Glaucoma in Myopia.

STORY, J. B. (*Ophth. Rev.*, August, 1911), because of the infrequency of chronic simple glaucoma in myopia reports two cases, one in myopia of 9 D., the other 5 D. and 4.5 D. respectively. These cases were watched over several years and visual fields accompany report.

N. M. B.

Accidents Which Have Occurred Through Color Blindness.

EDRIDGE-GREEN, F. W. (*Lancet*, September 23, 1911). This article was written because of the continued repetition of the misstatement that no accident has ever been shown to have occurred through color blindness.

One of the most extraordinary circumstances in this connection is the refusal of the authorities to have the eyesight examined of those who are responsible for a collision caused by an error in the interpretation of the colored signals. I am not aware of a single case in which either the Marine or Railway Department of the Board of Trade has had the color perception of an officer responsible for a collision examined, even by the very imperfect methods which are official with them. A man might just as well say that no person had ever died from a very common disease because this disease required for its certain diagnosis a microscopic examination of the blood, and this examination was never made.

Following are reports of 12 disasters occurring as a result of color blindness.

N. M. B.

The Histopathology of Diplobacillary Conjunctivitis. Based on the Examination of Twenty Cases.

McKEE, HANFORD (*The Ophthalmoscope*, October, 1911). The author examined tissue taken from the palpebral conjunctiva of adult patients who had had marked conjunctivitis, and where diplobacilli were present in large numbers. The tissue was fixed in Zenker's solution and hardened in alcohol, embedded in paraffin, and stained with eosin, methylene blue.

Under six different heads he gives a detailed description of the microscopic finding. In six cases examined, the slides were treated with Wright's stain and the diplobacilli were found on the surface on the epithelial cells in large numbers, and between the epithelial cells in smaller numbers. A few

were also found in the subepithelial tissue, lying free in the tissue and not intracellular. The author holds the last finding important as an explanation for the chronicity of this form of conjunctiva.

The following are his conclusions:

1. The epithelium is frequently infiltrated with polymorphonuclear leucocytes.

2. We may have an edematous condition of the epithelium with the presence of goblet cells, and cystic formations, the result of mucoid accumulation.

3. The conjunctiva is thickened because of the increase in the connective tissue of the subepithelial tissue, where we find young connective tissue cells, dilated capillaries, eosinophiles, and disseminated infiltration with lymphoid and plasma cells, the latter predominating.

4. The true appearance of the conjunctiva is a nodular one. This is borne out by a clinical evidence.

5. Diplobacilli are found on the surface of the epithelium, between the epithelial cells, and deep in the subepithelial tissue.

6. The essential lesion is in the subepithelial layer, which shows a chronic inflammatory process upon which an acute one is often superimposed.

W. R. P.

Retinoscopy Without Atropin, and Some Observations on Ocular Headaches.

WILSON, J. ALEXANDER (*British Medical Journal*, August 5, 1911), has examined 100 cases in young people from five to fifteen years of age. The first examination was by retinoscopy without atropin, the second by retinoscopy with atropin.

The average difference in the whole series was 1.6 D. "This method, without atropin is a little more difficult in some cases, but not much more so in a good dark room. Young people are apt to look at the operator, and the nimble accommodation may produce a varying condition, but a little watchfulness enables one to find the strongest lens that does not reverse the shadow." In a smaller series of myopic cases the difference was 1 D., "sometimes less, often there is no difference."

He discusses briefly the principal theories of the cause of the difference and remarks that "the value of atropin is estab-

lished, but certain facts should be kept in mind when it is employed."

Two hundred cases of headache have been tabulated and are discussed. E. S. T.

Removal of the Eyeball—A Quick and Easy Method.

ROBINSON, WILLIAM (*British Medical Journal*, November 11, 1911). The only instruments required are, a speculum, a pair of toothed fixation forceps, blunt-pointed scissors, and a needle and catgut suture. The eyeball is grasped with the fixation forceps to the outer side of the cornea, a firm hold being taken of all the structures down to the sclerotic and including the tendon of the external rectus. This hold is retained until the eyeball is removed. The tendon of the external rectus, conjunctiva, and capsule included, is first divided. Then the conjunctiva is divided close to the margin of the cornea, after which the globe is rotated strongly inward and the optic nerve is divided, leaving the other tendinous attachments to be cut as the globe is pulled forward between the lids. A conjunctival suture is used. E. S. T.

ABSTRACTS FROM GERMAN OPHTHALMIC LITERATURE.

BY

WILLIAM ZENTMAYER, M. D.,

PHILADELPHIA.

ALBERT C. SAUTTER, M. D.,

PHILADELPHIA.

FREDERICK KRAUSS, M. D.,

PHILADELPHIA.

AND

MEYER WIENER, M. D.,

ST. LOUIS.

The Ophthalmoscope Without a Central Opening.

GOLOWIN, S. S., Odessa (*Klin. Monatsbl. f. Augenheilkunde*, September, 1911), has devised a mirror for his ophthalmoscope which has a crescentic area cut away from one side from which the operator obtains his view of the fundus. The half moon opening is directed to the nasal side. Provision is made for the attachment of lenses, if desired, for high error of refraction. The author thinks that the inexperienced can more quickly become conversant with eyeground examination by its use. F. K.

Special Apparatus for Determining the Color Sense.

ZEEMAN AND WEVE, Amsterdam (*Klin. Monatsbl. f. Augenheilk.*, April, 1911), have devised a contrivance for determining the color sense which combines the following advantages: Special colors and their admixture in all wave lengths, saturation, and intensity can be presented to the ob-

server; they can be combined quantitatively with light of known intensity and wave length; the examinee is always under the control of the examiner; the apparatus is practical and inexpensive.

W. Z.

Transillumination of the Eye.

PELUGK, Dresden (*Klin. Monatsbl. f. Augenheilk.*, February, 1911), has devised a transilluminator which has interchangeable points, permitting of the application of the point high up in the cul-de-sac. The long glass rod which transmits the rays is covered to the top with a metal cap.

W. Z.

The Pathogenity of the *Diplobacillus Morax-Axenfeld* and the *Diplobacillus Liquefaciens* in the Ocular Interior.

TSCHISTAKOFF, P., Tösk (*Klin. Monatsbl. f. Augenheilkunde*, May-June, 1911). These bacilli are considered by Axenfeld and others to be nearly related and are capable of inducing disease in the cornea and conjunctiva. The question arises, if these bacilli can cause destruction of the cornea, what effect would the diplobacillus have when introduced into the ocular interior by means of a perforating wound?

The author introduces the diplobacillus Morax-Axenfeld into the anterior chamber of five rabbits and one ape, using the opposite eye for the introduction of the diplobacillus Petit. Similarly, he inoculates the vitreous in three rabbits and one ape, making in all twenty eyes treated.

In every case the reaction was much more severe from the introduction of the diplobacillus Petit. In every inoculated case, marked iritis with exudate occurred, lasting about four days. The diplobacillus Petit produced very intense iritis with greater exudate, subsiding, however, on the fourth or fifth day.

The reaction from the injections of the diplobacillus into the vitreous is more intense than that resulting from similar treatment of the anterior chamber, especially in apes, resulting in diffuse opacity, hypopyon and plastic iritis. Again, the diplobacillus liquefaciens was much more virulent than the Morax-Axenfeld.

Panophthalmitis never occurred. The author believes that panophthalmitis occurring in the Morax-Axenfeld infection is due to contaminating organisms rather than to the diplobacillus.

F. K.

**On the Anatomy of the Smooth Musculature of the Orbit and Lids,
in Particular the Membrana Orbitalis Musculosa.**

KRAUSS, W., Marburg (*Muench. med. Woch.*, September 19, 1911), concludes from his anatomical studies, the detailed results of which will be published later, that in the deeper portions of the human orbit a system of smooth musculature exists (membrana orbitalis musculosa), which so far has been overlooked, satisfying all anatomical requirements necessary to explain acute and chronic changes in orbital volume.

A. C. S.

Contribution to the Anatomy of Ectropion Uvae Congenitum.

OKUSE, Tokio (*Klin. Monatsbl. f. Augenhchik.*, April, 1911), examined a section of the iris removed from the eye of a youth presenting congenital ectropion uvæ. The iris tissue was markedly pigmented, especially in its anterior layers. The sphincter, both in its width and thickness, was of enormous dimensions. It was bent sharply towards the pupillary margin, so that the inner end of the muscle layer reached far forwards. The posterior pigment layer was greatly thickened; at the iris root it was somewhat too thick, but the nearer it approached the pupil the more numerous became the irregular outgrowths, which, however, only increased the thickness towards the pupil. At the pupil margin there was a projecting outgrowth which inclosed an irregular triangular cavity corresponding to the sinus annularis of Szily. Of the three walls the inner one was thick and plump, while the lateral walls reaching near the pupil were thin. The posterior wall was irregular. The surfaces toward the cavity were all smooth. Further forward there was another pigment knob. The cells were cylindrical in type. He considers the condition an anomaly of development consisting of a forward traction of the epidermal layer of the iris.

W. Z.

**Coloboma of the Chorioid and Retina With Aplasia of the
Optic Nerve.**

MEISNER, W., Koenigsberg (*Graefes Archiv. fuer Ophthalm.*, Vol. 79, Part 2), reports the microscopical findings of such a case of interest because the eye was of almost normal size, the portions of the secondary optic vesicle fully devel-

oped, the fetal cleft closed and the anterior ocular segment normal.

There was complete absence of the optic nerve, rudimentary development of the chorioid, retina and pigment epithelium in the region of the fetal cleft (coloboma). In the entire retina there were no functionally active ganglion cells, nerve fibres or vessels. Besides there was an atypical coloboma of the retina and pigment epithelium situated in the ciliary body.

The cornea showed marked vascularization and many cells. The iris was poorly developed and close to the cornea.

There was double-sided hare-lip and cleft palate. A. C. S.

A Contribution to the Question of the Inheritance of Acquired Ocular Defects.

TOBIAS, Berlin (*Klin. Monatsbl. f. Augenheilk.*, April, 1911). As bearing upon this question Tobias records an instance where a mother with bilateral operative colobomata of the iris gave birth to two children in a family of five with congenital colobomata of the iris and chorioid. The oldest children had normal eyes. The operation had been performed four years before her marriage. In the right eye the coloboma was below and in, and in the left eye, up and in. The one, male, child which died in its first year, had bilateral colobomata below. The living, female, child, 19 years of age, had a coloboma of the iris and chorioid down and in. W. Z.

Concerning the Conjunctival Disease of the New-born Analogous to Trachoma in the Adult.

WOLFRUM, Leipzig (*Munch. med. Woch.*, July 11, 1911), reviews the literature and reports the results of examination in forty cases of new-born blenorrhœa showing inclusions. In the main these findings agree with Lindner's descriptions, characteristic of the disease being the time of onset, 5-14 days after birth, a mild muco-purulent secretion without much lid swelling, marked swelling of the transitional folds and a peculiar punctate or stippled appearance of the lower tarsal conjunctiva and transitional fold, probably the result of unequal infiltration of the subepithelial tissue. Follicles occur late in the disease. The gross changes which occur in trachoma are never seen.

The inflammation readily yields to protargol solutions.

The follicle, scar and pannus formation in the adult is probably due to the greater development of the plasma cell apparatus. Follicles and cicatrices in a mild form may occur in the new-born conjunctiva, but never pannus. A. C. S.

A Contribution to the Ophthalmias of the Newborn.

BARTELS, ROLF, Dresden (*Klin. Monatsbl. fuer Augenheilkunde*, May-June, 1911). The occurrence of Gram negative diplococci in the conjunctiva, which were not gonococci, but were apparently of close kin, induced the author to study the diplococci in the ophthalmias of the newborn. He made a number of cultures for differential study of the various diplococci, demonstrating cultural differences in the meningococci, gonococci and micrococcus catarrhalis.

He finds that the inflammations caused by the rods resembling diphtheria bacilli are in many ways clinically similar to that caused by gonorrhea. Though the duration of these cases is often prolonged, actual suppuration is much shorter. The author found but few pneumococci, and feels that they were not the pathogenic factors.

In seventy cases of blennorrhea in infants, Bartels found thirty-eight cases, or 58%, due to gonococcus. In one-half the cases, the inflammation was intense. The average duration of the disease was three to six weeks, though one case showed gonococci after fourteen weeks. The cessation of suppuration was not coincident with the absence of gonococci, the latter being found for some time after pus had apparently disappeared.

The cornea is endangered only when there is a defect in the epithelium. The midwife should be compelled to notify the health authorities in every case of suspicious eye inflammations of the newborn, as the Crede method sometimes fails.

F. K.

The Histology of Experimentally Produced Inclusion Conjunctivitis.

HEGNER, Jena (*Klin. Monatsbl. f. Augenheilk.*, April, 1911). Hegner's studies were made from the excised entire retrotarsal fold, some during life, some postmortem, of infected apes. The histological appearances were those possessed by trachomatous conjunctiva in the human. Control examinations of the conjunctiva of healthy apes and guinea pigs

showed similar nodes to those found in the diseased tissues, so that these elements must be considered normal, but otherwise the appearances were quite different. He says that notwithstanding the clinical and anatomical similarity of trachoma and inclusion conjunctivitis they can be differentiated. The follicular formations may be looked upon as the expression of a chronic inflammatory process affecting the mucous membrane, its origin being due to the action of different viruses. Especially is blenorrhoeal secretion disposed to excite such a trachoma-like conjunctival process. W. Z.

Microscopic and Experimental Studies as to the Habitat of the Prowazek-Halberstadter Bodies.

HEYMANN, Berlin (*Klin. Monatsbl. f. Augenheilk.*, April, 1911), examined the secretion in 281 cases, including various forms of conjunctivitis and keratitis. He concludes that these bodies are found, besides in trachoma in the early stages, also in nongonococcal and gonococcal conjunctivitis of nursing and mother and in genital secretion of the parents of such newborn, and also in the genital secretion of the parturient, although, in all it seemed as though a trachomatous infection could be excluded. In his animal experimentation he found that the ocular secretion in six instances of blenorrhoea of the newborn and in one of a nontrachomatous conjunctivitis of a parturient, produced in Pavians a conjunctivitis of varying intensity and course, mostly accompanied by trachoma-like involvement of the follicles and the appearance of the trachoma bodies. Undoubted trachoma symptoms were never seen. Transfers of the affection from animal to animal gave positive results. One female ape inoculated in the vagina by conjunctival secretion from an ape developed a peculiar granular inflammation of the vagina, in the secretion of which the bodies were found. In 7 cases of genital secretion, in adults (2 men and 4 women), in which the existence of the bodies in the genital apparatus was to be suspected, showed by inoculation of the conjunctiva of apes analogous clinical appearances to the conjunctival secretion in inclusion conjunctivitis produced by the Prowazek-Halberstadter bodies. In his opinion this much may be definitely stated: That the inoculation results obtained from ocular and genital secretion must be due to a similar virus in a manner quite similar to the way that the gonorrhoeal poison from the mother's genitalia is con-

veyed to the child intrapartum. He believes that this virus and that of trachoma are different. W. Z.

Microscopic Findings in Vernal Catarrh. (Preliminary Report.)

BOTTERI, Triest (*Wiener klin. Woch.*, October 12, 1911), found in several cases of vernal catarrh initial bodies and inclusions resembling those which Lindner has described as typical of trachoma and inclusion blennorrhea. A. C. S.

Concerning Anaphylactic Corneal Changes. (Experimental Production of a Parenchymatous Keratitis by "Artfremdes" Serum.)

WESSELY, Würzburg (*Munch. med. Woch.*, August 8, 1911), concludes that in spite of, or perhaps because of, the slow metabolism in the rabbit cornea, it is exceptionally easy to induce marked anaphylaxis through the cornea and that during the stage of hypersusceptibility the cornea locally reacts to the same antigen, in the form of a parenchymatous keratitis, which reaction is probably closely related to other recognized local reactions. (Arthus's phenomenon.)

A. C. S.

Erosion of the Conjunctiva Resulting From the Penetration of a Cilium Into the Upper Canaliculus. Concerning Latent Cilia in the Canaliculi.

VALLERT, Leipzig (*Klin. Monatsbl. f. Augenheilk.*, April, 1911), records five cases in which symptoms of a foreign body in the eye, with slight injection of the bulbar conjunctiva in the area between the cornea and the caruncle, was due to a cilium projecting from the canaliculus rubbing upon the conjunctiva. W. Z.

A Persistent Annular Opacity Following a Central Annular Parenchymatous Keratitis.

REITSCH, Hirschberg (*Klin. Monatsbl. f. Augenheilk.*, July, 1911). There was a history indicating a past parenchymatous inflammation of both eyes. The anterior layers of both cornea presented a gray-white annular concentric opacity, the outer margin of which was about three mm. from the limbus. The opacity was not circular, but ragged, and was made up of confluent infiltrates. Within the ring the cornea was diffusely hazed both superficially and deeply. W. Z.

A Case of Primary Fatty Degeneration of the Cornea.

TERTSCH, Vienna (*Klin. Monatsbl. f. Augenheilk.*, July, 1911). The patient was a farmhand, 32 years of age. The left eye had been inflamed 2 or 3 months, 5 years previously. The present attack was of 3 months' duration. The right eye had been inflamed 2 years. The corneae were occupied by a horizontal elliptical yellowish-white saturated opacity 8 by 5 mm. eccentrically situated down and out. There was a more deeply saturated opacity within this. The surface of the cornea was diffusely hazed and in places stippled. Under the loup the opacity was seen to be composed of numerous uniformly saturated flaky dots. They appeared to be in the superficial layers of the membrane in the center and within the superficial and deep layers in the periphery. Vision was greatly reduced. Histologically the changes were of the nature of an extensive fatty deposit, both in the epithelium and in part in the vitrified swollen and in part crumbled or greatly shrunken corneal lamellae and in vacuoles produced by the shrinking tissue. The progressive course of the disease, the similarity of the histological findings to other true degenerations, and a fatty degeneration of the vessel walls speaks for a true degenerative process.

W. Z.

On a Method of Common Experimental Production of Ocular Malformations and Congenital Cataract in Vertebrates.

PAGENSTECHE, H. E., Strassburg (*Munch. med. Woch.*, August 8, 1911). The author's experiments show that not every malformation is attributable to some germ anomaly and therefore inherited, the view held by most modern investigators, but that such conditions may be brought about by toxic agents.

The production of 10 different malformations (iris, choroid, lens, lids, etc.) in living offspring occurred in 50% of rabbits and in 33% of guinea pigs, whose mothers had been fed on naphthalin during the pregnant state. This is consequently the first known method of producing true malformations in vertebrates by the influence of toxins upon the formative processes of fetal development.

The possibility of inducing cataract and malformations by the same toxic agent throws light on the frequent association of malformations with cataract.

A. C. S.

Clinico-Anatomic Contribution to Our Knowledge of Secondary Cataract.

ELSCHNIG, Prag (*Klin. Monatsbl. f. Augenheilk.*, April, 1911), describes a peculiar form of secondary cataract observed by him in five cases. In all, the peripheral part, apparently the border of the defect in the anterior capsule, was composed of a thick grayish-white membrane, while the central portion was either less or more homogeneous; or, especially in the membranous after cataract, the contiguous parts, by oblique illumination, were seen to consist of gray-white flecks, dots or lines between which there were peculiar glistening globular bodies resembling cholesterine. With the corneal loup the water clear drops in certain positions appeared golden and the globular bodies appeared for the most part colorless and transparent with dots, lines and flecks between. In one case the drops appeared like oil drops in water. Throughout this structure lay upon the posterior capsule and at times floated with this on movement of the eyes. In a sixth case there was a collection of transparent bodies upon the posterior capsule. In all of the cases two right angled incisions were made, causing the tissues to disappear from the visual area. He has in his collection of after cataract three cases which correspond to the clinical findings in the above cases. They show a more or less active proliferation of the lenticular epithelium, which as shown by Wagenmann leads on the one hand to tough capsular thickening; on the other hand, in analogy to the biologic properties of the epithelial cells in the crystalline nub, to the formation of lens cells. So far as the anatomical findings go it would seem that not only the cells of the equatorially placed epithelium which grows to such lens plasma, but also the epithelial cells of the anterior capsule.

W. Z.

A Severe Case of Secondary Cataract and Its Operative Treatment.

KRÜGER, Kottbus (*Klin. Monatsbl. f. Augenheilk.*, April, 1911). The case was one of bilateral iridocyclitis following cataract extraction in a man 68 years of age. In both eyes the iris was drawn up into the corneal scar. In the left eye it was also adherent to the secondary capsular membrane. From the experience gained from this case he recommends for similar cases the following procedure: An incision with

a lance knife 3 mm. up and out from the center of the cornea. Dialysis of the iris with strongly curved forceps opposite the wound and also downward and inward, drawing of the separated iris into the wound and its abscission. Or if by this method too much iris would be separated from the ciliary body, to abscise the iris within the anterior chamber with the De Wecker scissors. After the eye has become quiet the secondary cataract is operated upon either by excision or some other method, according to the character of the membrane.

W. Z.

Foreign Bodies in the Lens.

ZIMMERMANN, Goerlitz (*Klin. Monatsbl. f. Augenheilk.*, July, 1911). The patient, an intelligent man, came because of failure of vision of the left eye. He could not at first recall an injury, but on careful questioning it was elicited that something flew into the eye while "passing coal." There was a fine linear corneal opacity, an anterior synechia and a corresponding opacity in the lens. After preliminary iridectomy the lens was removed by the Smith method. V. = 5 5. The lens contained a piece of coal.

W. Z.

Concerning Hereditary Chorioiditis in One Family.

LUTZ, ANTON, Breslau (*Klin. Monatsbl. f. Augenheilkunde*, May-June, 1911), reports a family of nine children in which four of the female members were suddenly attacked with chorioretinitis at the ages between ten and twelve years. The rest of the children, two girls and three boys, remained free of the disease. The parents and grandparents were unaffected with ocular disease. There was no history of trauma or lues.

F. K.

Concerning Postoperative and Spontaneous Detachment of the Chorioid.

MELLER, J., Vienna (*Gräfe's Archiv. f. uer Ophthal.*, Vol. 80, Part 1), arrives at the following conclusions, the result of extended investigations:

1. The most usual form of chorioidal detachment, the clinical characteristics of which Fuchs has described in detail, is best designated *post-operative early detachment of the ciliary body and chorioid*. The clinical signs include absence or shallowness of the anterior chamber, lowered tension, periph-

erally situated dark eminences of various sizes disappearing entirely in the course of a few days, the prognosis thus being quite favorable. This complication occurs during the early post-operative period.

Fuchs attributes this variety to a retrograde filtration of aqueous into the suprachorioidal space through a tear in the pectinate ligament, Meller to a disturbance in tension, secretion and flow of the intraocular fluids. The marked transudation from the vessels of the ciliary processes which follows opening of the globe results in fluid collecting on the outer surface of the ciliary body detaching the same, the subsequent progression of fluid into the suprachorioidal space bringing about detachment of the chorioid. Inasmuch as under the most favorable conditions only that portion of the fundus is visible with the ophthalmoscope situated $8\frac{1}{2}$ mm. from the limbus, it is readily conceivable that slight detachments of the ciliary body can not be discerned, though obliteration of the anterior chamber and lowered intraocular tension may suggest such a complication. Only marked instances of the affection result in the typical clinical picture of post-operative detachment of the ciliary body and chorioid. The eye is soft because of deficient wound closure. Tension may also fall because of drainage through the suprachorioidal space, as occurs in other varieties of chorioidal detachment associated with closure of the anterior chamber. This variety always occurs the first days after operation.

2. The second variety he designates *post-operative late detachment*. He cites Fuchs' case in which four months after extraction a detachment was discovered which endured two months. Vision remained normal.

In the writer's two cases and in Marshall's case retinal detachment also occurred, the cases terminating in blindness. Some of these malignant cases are probably attributable to deficient wound closure, epithelial inclusions, etc., permitting escape of aqueous.

3. *Spontaneous Chorioidal Detachment.*

(a) One form sets in with the clinical symptoms of a post-operative early detachment (cases of Graefe and Liebreich). This variety apparently also originates at the ciliary body and then spreads posteriorly. Subsequently there results a transudation over the inner surface of the chorioid leading to detachment of the retina. The etiology is obscure. Since,

however, the detachment first affects the ciliary body the causative factors may be similar to those of post-operative detachments.

(b) The second variety he terms *posterior chorioidal detachment*, cases of Michel, Berger, Walter, Elschmig, Story and Simon. While in a pathological transudation involving the ciliary body, fluid collects in the interior and in the perichorioidal space and causes detachment of the ciliary body and chorioid, a transudation involving the true chorioid results in fluid exudation over both surfaces of the chorioid detaching the chorioid from both sclera and retina. Various clinical pictures may result, depending upon the degree and position of the transudation. In cases in which retinal detachment has not yet occurred less distinct protrusions occur, the chorioidal and retinal vessels being in the same niveau. (Michel, Berger, Walter.) Elschmig considers these of inflammatory origin, but in most cases this does not seem to be the case. When this transudation principally confines itself to the inner surface of the retina, symptoms of retinal detachment predominate, obscuring the chorioidal detachment, the underlying cause. This posterior chorioidal detachment may play a part in the etiology of the typical serous myopic retinal detachment, a view first advanced by Leopold Mueller. It will probably require considerable study to determine the relationship between chorioidal and retinal detachment and in particular the exciting cause of transudation.

A. C. S.

Experimental Sympathetic Ophthalmia.

GULLERY, Cologne (*Klin. Monatsbl. f. Augenheilk.*, July, 1911), discusses the question of the possibility of producing sympathetic ophthalmia experimentally. He states that while he cannot state positively that he has succeeded in producing typical sympathetic ophthalmia experimentally, he has produced a sympathetic disease which perhaps might be considered the first stage of the disease. He has now under observation several animals which show marked contraction of the pupil in the second eye.

W. Z.

The Pathogenesis of Sympathetic Ophthalmia—Part 2.

DEUTSCHMANN, F, Hamburg (*Gräfe's Archiv. fuer Ophthalm.*, Vol. 79, Part 3). In the first and second parts of this

treatise the author reports on the findings in 19 animals in which inflamed ocular parts from man or animal were introduced into the anterior chamber or vitreous. Two animals showed general disease and had to be excluded from the report.

In the other 17 animals the inflammatory changes remained confined to the first eye in only two, the first opticus and meninges being involved 13 times, the first opticus, meninges and second opticus 10 times, the first and second opticus once, the first opticus once, the meninges once, both optici and the second eye 8 times, once without meningeal involvement.

These findings indicate that it is not impossible for bacteria to leave the eye, to struggle against the lymph stream in the nerve sheath and reach the brain and its coverings. Fourteen animals showed meningitis microscopically (chronic localized leptomeningitis) unassociated with signs of a general disturbance. In every one of the eight animals in which a sympathetic inflammation ensued, it was possible to demonstrate traces of disease in both optic nerve sheaths; only once were the meninges not involved.

He therefore considers it proven that in sympathetic ophthalmia the bacteria invade both optic nerve sheaths in order to gain access to the second eye.

The minimum time required for the affection to reach the second eye is considered to be about ten days. The time for bacterial emigration from the exciting eye therefore need not coincide with the establishment of the "typical findings," but may occur earlier at a time when it is impossible to differentiate sympathetic inflammation from a simple fibrino-plastic inflammation. This explains why in a number of cases the "typical findings" were not found, though there was evidence of sympathetic disease in the fellow eyes.

To effect sympathetic inflammation bacteria must be introduced which readily multiply in lymph channels and sufficiently virulent to stand the long journey through the nerve sheaths.

The development of the "typical findings" from a simple fibrino-plastic inflammation occurs simultaneously with bacterial transmigration and is generally completed by the time the bacteria have reached the second eye.

The favorable result following enucleation is probably not

alone dependent upon the removal of diseased portions of the eye and its contained microorganisms, but upon the opening and drainage of the lymph sheaths assisted by the bactericidal property of the new formed lymph. Because of the reverse lymph current in the first nerve sheath, this portion offers the most difficulty to bacterial progression. Allowing a minimum of ten days for a complete journey, the chiasm would probably not be reached before the seventh day. Enucleation within this period would promise a favorable result.

The prompt subsidence of papillo-retinitis sympathetica after enucleation points to toxins as the causative factor, the toxin formation occurring at the chiasm. The favorable action of enucleation must therefore extend to processes at the base of the brain. The cases complicated by atrophy must be differentiated from those of genuine papillo-retinitis sympathetica. The atrophy is the result of a retrobulbar neuritis. Both affections, however, may occur in the same eye.

Plasma cells were found in sixteen eyes with chronic post-traumatic inflammation. Ten of these had caused clinical signs of inflammation in the fellow eye. He considers the lymphocytes in the chorioid of the exciting eye for the most part derived from plasma cells.

A. C. S.

Observations Regarding the Statistics of Sympathetic Ophthalmia.

DUTOIT, A., Lausanne (*Græfe's Archiv. fuer Ophthalm.*, Vol. 79, Part 2), concludes that the statistics of sympathetic ophthalmia should be uniformly subjugated to the principle of duplicity; that the frequency of the affection should be considered in relation to the age of the patient and not in relation to the number of injuries nor exclusively to the number of uveites; that the frequency in youth, especially in the female, and the study of the interval period in different ages deserves especial attention.

A. C. S.

On Elschnig's Theory Regarding Sympathetic Ophthalmia.

V. HIPPEL, Halle (*Græfe's Archiv. fuer Ophthalm.*, Vol. 79, Part 3), concludes that until Elschnig is able to furnish more satisfactory evidence, there is no reason why his theory should be accepted or even considered probable.

A. C. S.

Concerning Ophthalmoscopically Visible Vascular Changes in Central Scotoma Following Tobacco and Alcohol Amblyopia and Arteriosclerosis Cerebri.

KRUEGER, A., Kottbus (*Klin. Monatsbl. fuer Augenheilkunde*, May-June, 1911), finds that in cases of tobacco and alcohol amblyopia, there are pronounced vascular changes of the macular artery and veins, similar to those found in arteriosclerosis. They consist mainly of:

1. Hazy outline of the arterial walls without circumscribed narrowing.

2. Irregular outline with more or less marked contraction of the lumen.

3. Faint haze on the papilla or at the crossing of underlying veins.

4. Occasional breaking of the lumen of the veins by the underlying artery.

In addition there is marked blanching of the left half of the optic nerve and more or less marked change in the macula. The author is strongly inclined to the belief that the primary changes in retrobulbar neuritis are due to disease of the macular arteries, causing disease of the macular fibres of the nerve, showing secondarily in the retrobulbar part of the optic nerve.

F. K.

Concerning the Meaning of Exclusion of the Macula in Hemianopic Visual Fields.

HENNING-ROENNE, Copenhagen (*Klin. Monatsbl. f. Augenheilkunde*, September, 1911). Macula exclusion in hemianopsia has been frequently discussed in literature with no final agreement as to its etiology. The principal theories have been: (1) v. Monokow's theory, which states that there is no cortical centre for the macula. (2) Willbrand's theory, which consists of a double supply of the macula by means of a bifurcation of each macula fibre in the chiasma. (3) Hirschberg and Schweigger explain exclusion of the macula by an extension of retinal fibres to the opposite side of the retina. (4) Roenne believes that when the hemianopsia is sufficiently marked to abolish the vision in the periphery, the macula fibres being much more acute in function, would functionate sufficiently to cause the macula exclusion to appear in the visual field. The author shows 27 cases of hemianopic fields in which the vision is more acute on the healthy side of the macula than on the affected side.

F. K.

Concerning a Nearly Isolated Degeneration of the Ganglion Retinae.

V. HIPPEL, Halle (*Gräfe's Archiv. fuer Ophthal.*, Vol. 79, Part 3), found in an eye which had been enucleated for carcinoma of the limbus and cornea, about the disk an area 12-14 mm. in diameter in which a degeneration presented itself confined almost exclusively to the external retinal layers, characterized by complete absence of rods and cones and secondary disturbance of the pigment epithelium. Excepting a small area 1 mm. behind the ora serrata where complete degeneration of the retina was demonstrable, the other portions of the retina appeared entirely normal. The chorioid was normal.

The case shows that although the fundus may appear normal or only slightly disturbed and the disk healthy, there may be blindness due to a peripheral lesion. A. C. S.

The Anatomical Basis of a "Very Rare Affection of the Retina" Which I Have Described.

HIPPEL, E., Halle (*Gräfe's Archiv. fuer Ophthal.*, Vol. 79, Part 2), concludes that the affection which he described in 1904 under the title of "A Very Rare Affection of the Retina," and which so far has been observed about 20 times, anatomical study of six eyes (Tr. Collins 3, Czermak-Ulbrich 2, V. Hippel 1) shows to be an angiomatosis of the retina with secondary disease of the retinal vessels, obliteration of the nervous retinal elements, proliferation of the glia and extensive subretinal hemorrhages with subsequent organization.

Czermak's views, advanced without knowledge of Collins' cases, in view of the uniformity of the findings, may therefore be considered substantiated. A congenital predisposition is probably also present which is in accord with the general conception of angiomata. The occurrence of the affection in two sisters (Collins) is suggestive evidence.

The ophthalmoscopic diagnosis is usually easy, being dependent principally upon the presence of reddish, spherical formations, the enormous dilatation, tortuosity and uniform color of one or more arteries and their collateral veins.

The disease is distinctly chronic; the prognosis regards vision absolutely unfavorable, blindness and secondary glaucoma being the ultimate results. Enucleation being indicated

only when pain supervenes, it will probably never be possible to obtain a specimen showing the incipient stages of the disease.

A. C. S.

Studies Into the Fields of Vision to Determine the Relation Between the Peripheral Visual Acuity and the Color Sense; With Particular Reference to Its Prognosis in Optic Nerve Atrophy.

ROENNE, Copenhagen (*Klin. Monatsbl. f. Augenheilk.*, February, 1911), first discusses the various forms of visual field defects and then takes up: 1. The fields in stationary optic atrophy. All of the eight cases were secondary to optic neuritis. They all showed the color sense most affected, but likewise showed that the peripheral visual acuity was in a measure affected proportional to the involvement of the color sense. That in no case was there blindness for any color has its explanation in the above relation. If in a case of stationary optic atrophy the color field be entirely absent, coincidentally the visual acuity (also the central visual acuity) would be so reduced that it would be difficult or impossible to take the visual field. 2. Progressive optic atrophy. In nine of the eleven cases the diagnosis of tabes was definitely made. In one it was doubtful, and in one the Wassermann reaction was positive in both the patient and his mother. Some of the cases showed a proportionate affection of both the peripheral vision and color, while others showed a disproportionate affection. They were all progressive cases. The first condition was met with in advanced cases and the latter in recent cases. He finds that the prognosis is graver the greater the proportion of the affected to the non-affected. The significance of this axiom is that tabetic atrophy is a disease of the conducting fibres and not of the peripheral system. This is further shown in the fact that in several of the cases the fields show the nasal "sprung"; that is, a straight line limitation of the field corresponding to the raphe that the nerve fibres make in the temporal portion of the retina. There is no anatomical reason for believing that the cellular elements of the retina have any such arrangement. He believes that the prognosis can be based on the proportionate or disproportionate failure of peripheral vision and the color sense. The former affords a favorable prognosis, the latter an unfavorable one. In 24 cases of chronic simple glaucoma he found always a propor-

tionate failure of the peripheral vision and the color sense. In a portion of the cases the color sense was greatly affected, the peripheral field for small white objects was found to be correspondingly affected. In optic neuritis there was a proportionate failure and these cases were relatively benign and stationary. It must be borne in mind that a disproportionate failure in these cases does not necessarily mean a bad prognosis as it would in tabes, as here there is an acute diminution of conductivity which may be recovered from. He has never seen reduced peripheral vision with good color vision in disease involving the fibres but twice (excepting diffuse chorioidal disease). He has seen good peripheral vision and reduced color sense in progressive atrophy of acute optic neuritis.

W. Z.

The Color of the Macula Lutea.

VAN DER HOEVE, Utrecht (*Graefe's Archiv. f. uer Ophthal.*, Vol. 80, Part 1). Gullstrand's assertion that the yellow color of the macula is due to postmortem changes, otherwise it would be apparent in highly pigmented fundi and in acute ischæmia of the retina is not upheld by the facts in a case of ischæmia observed by the writer.

In this instance after a severe traumatism there occurred clouding of the retina with contraction of the retinal arteries. Complete rupture of the nerve seemed a reasonable conjecture. The color of the macula was yellow, the size of the yellow portion being about $\frac{1}{2}$ disk diameter. The centre was darker in color and the margin greenish. Examination with electric light and daylight gave the same results.

He attributes the yellow appearance of the macula in this case to associated chorioidal anemia. When the chorioid remains unaffected (no lesion of the ciliary vessels), its red color shines through and obscures the normal yellow color of the macula.

A. C. S.

The Pathogenesis of Hydrophthalmos Congenitis.

SPIELBERG, CHAJI, Berne (*Klin. Monatsbl. f. Augenheilkunde*, etc., September, 1911). The opinions of the various authors show no unanimity regarding the pathogenesis of hydrophthalmos congenitis. Formerly there was an almost universal opinion that it was due to a hypersecretion in the eye, but in the past four or five years it is recognized

that it is more probably due to retention of fluid in the eye, due particularly to the studies of Treacher Collins, Reis, Seefelder and Michelson-Robinovoitsch. These studies have shown a great diversity in the pathologic anatomic processes causing the clinical symptoms of hydrophthalmos, but that these processes have all been such as to favor the retention of fluid in the eye.

Spielberg reports the pathologic findings occurring in a young baby, in which he includes the microscopic appearance of the eyeball. The striking features of both eyes was the absence of the slightest inflammatory appearance in the uveal tract which could yield a hypersecretion, and secondly, an entire absence of Schlemm's canal. This proves definitely that the retention theory is in this case the only tenable one. An iridectomy could be of value in such a case only, through leakage in the scleral wound, which object could be obtained by an anterior sclerotomy.

F. K.

Metastatic Panophthalmitis Produced by a Gramme Negative Coccus Not Identical to the Weichselbaum Meningococcus.

PAGENSTECHER AND WISSMANN, Strassburg (*Klin. Monatsbl. f. Augenheilk.*, April, 1911). The clinical history of the case was as follows. A child 5 months old had, two and one-half weeks previously been febrile, this being accompanied by inflammation of the left eye. A beginning panophthalmitis was present, accompanied by opisthotonos. The eyeball was enucleated and cultures made from the purulent vitreous. In 24 hours there was a pure culture of a Gramme negative diplococcus. It differed from the meningococcus morphologically through the absence of tetrads; culturally through relative indestructibility, its growth upon the usual culture media, its fermentation properties, and particularly through its failure of agglutination of a specific serum. Its identity to other Gramme negative organisms could not be determined. The cocci were found in the interior of the globe, in some places numerous, in other places only scant, both in the anterior and posterior segments. In the absence of lumbar puncture it must be assumed that the child had meningitis. The case demonstrates that metastatic ophthalmia may be excited not only by the Weichselbaum meningococcus, but also by the allied but sharply differentiated pseudomeningococcus.

W. Z.

A Large Dermoid of the Cornea.

TISCHNER, Freising (*Klin. Monatsbl. f. Augenheilk.*, July, 1911). The growth was present in the left eye of an otherwise normal young man. It involved the entire cornea and extended circularly upon the sclera. The iris was in contact with the cornea in the lower half of the globe, as was also the shrunken cataractous lens. In the upper segment there was anterior chamber and except at its foot the iris was free and in normal relations.

W. Z.

Carcinoma of the Chorioid Beginning With Acute Iritis.

HEGNER, Jena (*Klin. Monatsbl. f. Augenheilk.*, July, 1911). The patient was a woman who three and one-half years previously had had her left breast removed for carcinoma. Following what was diagnosed as a rheumatic iritis, grayish-white foci appeared in the fundus periphery, due to detachment of the retina. Later the eye was enucleated for intra-ocular new growth. Microscopically the tumor occupied the posterior and outer portion of the globe as a flat mass. It was an alveolar carcinoma of the chorioid.

W. Z.

Unpigmented Nevus of the Conjunctiva and Cornea.

JARVORSKI, AUGUST, Leniberg (*Klin. Monatsbl. f. Augenheilkunde*, May-June, 1911), reports a case of nevus occurring in a woman forty-five years of age. It was of a yellowish red color, beginning at 3 mm. from the inner corneal margin, extending across the cornea beyond the center, making a sharp curve to the lower corneal edge. It varied in width from one to seven mm. A small piece of the conjunctival nevus was removed and examined histologically.

F. K.

A Case of Myasthenia With Ocular Symptoms.

NOICA AND ENESCU, Bukarest (*Klin. Monatsbl. fuer Augenheilkunde*, May-June, 1911), report a case of myasthenia in which the patient had diplopia after using the eyes for a short time, the eyes tiring very rapidly. Rapid closure and opening of the lids was quickly followed by inability to raise them until rested for a few moments.

F. K.

A Case of Quinine Amanrosis.

MANOLESCU, D. N., Bukarest (*Klin. Monatsbl. f. Augenheilkunde*, September, 1911). The patient had taken about 13 grains of quinine sulphate with the probable intent of causing abortion. Fifteen minutes later she was seized with intense headache, vertigo, ringing in the ears, vomiting, and loss of consciousness. After two hours she recovered consciousness with entire loss of her hearing and sight. Four days later her hearing was improved, but her sight was light perception.

The optic disks were pale and of a yellowish red color, the retina hazed, yellow red, and very anemic. The veins were enlarged, well filled, wine red, the arteries being very much contracted, threadlike. The vision gradually improved under treatment, central vision being slightly restored after a period of eight days. The vision in one eye was normal in fourteen days. The fields of vision were very narrow, concentrically contracted, but reached nearly to the normal after one year. The ophthalmoscopic picture remained that of optic atrophy, wherefore the good vision and visual field was the cause of surprise to the author.

F. K.

Concerning Ocular Disease in Acne Rosacea.

HILBERT, R., Sensburg (*Munch. med. Woch.*, July 18, 1911), reports a case of bilateral symmetrical vascular keratitis complicating an acne rosacea in a 61-year-old man. The usual local medication proved unsatisfactory. The patient was then transferred to a dermatologist for treatment of his acne. Though no ocular treatment was administered during this time, a decided improvement occurred in the ocular condition.

A. C. S.

On Optic Neuritis in Typhus Fever.

ARNOLD, V., Lemberg (*Wiener klin. Woch.*, August 17, 1911), in 14 cases of typhus fever found 8 marked and 2 slight cases of optic neuritis, the inflammation usually occurring about the end of the first or the beginning of the second week without marked subjective symptoms. This complication outlasted all other symptoms, but no unfavorable results were observed.

Optic neuritis being quite a rare complication of typhoid fever, its discovery in doubtful cases becomes of diagnostic

importance. In no other acute infectious disease, excluding meningitis, does optic neuritis apparently occur so frequently. Further observations are necessary to substantiate these views.

A. C. S.

Concerning Albuminuric and Nonalbuminuric Detachment of the Retina and Its Reattachment in Pregnancy.

VERDERAME, Freiburg (*Klin. Monatsbl. f. Augenheilk.*, April, 1911), reports a case of detachment of the retina in a woman 29 years of age occurring four years previously during pregnancy. The left eye showed a total detachment of the retina with lenticular opacities. The right eye showed patches of chorioiditis at the pole and at the macula. At a later pregnancy, the fourth, the retina became detached in the right eye. Artificial labor was induced and under treatment the retina became reattached. The author gives the histological findings in a case of bilateral detachment in a patient with nephritis. From these two studies he concludes: That retinitis albuminuric gravidarum with retinal detachment can occur not only with true nephritis but with nephritis of pregnancy. Such a detachment as the latter may become reattached without leaving a trace and the kidneys become entirely sound.

In the author's case the only permanent lesion was an arteriosclerosis of the chorioidal vessels. This would indicate that the chorioid was primarily involved. In rare instances the detachment may occur in the nonalbuminuric pregnant. In the albuminuric as with the nonalbuminuric, after induced labor, the retina may become reattached without sequelæ. That the continuance of the pregnancy in both classes of cases influences unfavorably, though not always, the detachment, so that the induction of labor is indicated provided one individualizes strongly. The question of the prevention of further conceptions must also be considered.

W. Z.

My Experience With Palliative Trepanation in Papilledema.

HIPPLE, A. v., Goettingen (*Klin. Monatsbl. f. Augenheilk.*, July, 1911), states that his experience with this operation corresponds with that of E. v. Hippel, as given by him in 1908—that properly and early performed the operation not only prevents threatened blindness but prolongs the life of the patient.

He reports 14 cases, all operated upon by the late Dr. Braun. Seven are living, and in all but one the vision is better than at the time the operation was performed, and in that one it is unchanged. The period of observation ranges from four months to two years. W. Z.

Concerning the Relation Between Vitiligo and Ocular Affections.

ERDMANN, Rostock (*Klin. Monatsbl. f. Augenheilk.*, February, 1911), believes that the following case lends support to the assumption of Gilbert that in his case of anterior uveitis there was an association between the ocular condition and the vitiligo present: A healthy man, 44 years old, with vitiligo, without apparent cause developed loss of vision with hemeralopia later, further deterioration occurred from a severe exudative retinochorioiditis in the anterior portion of the globe. The symptoms suggested syphilis, but the Wassermann reaction was negative. All other assignable causes were absent. He believes it not unlikely that the inflammatory process observed in the anterior segment of the globe belongs to the category observed in heterochromia and that the cause of the disease, which possibly was responsible earlier for the disturbance of the pigment, and later excited the chorioidal disease, was likewise responsible for the vitiligo. In all cases of inflammation of the chorioid of the above class it behooves the clinician to examine the areas of predilection (genitals and anal folds) for the presence of vitiligo. W. Z.

Vitiligo and the Eye.

KOMOTO, Tokio (*Klin. Monatsbl. f. Augenheilk.*, February, 1911). In Komoto's case there had been an acute inflammation of the chorioid with a general absorption of the pigment as a sequel. The iris was unaffected. The papillæ were pale and the retinal vessels unaffected. Almost coincident with the ocular conditions vitiligo developed. W. Z.

Retinal and Optic Nerve Affections. (Contribution to Our Knowledge Concerning the Relationship Between Affections of the Eye and Nose.)

KLEIJN, A. DE, Utrecht (*Graefe's Archiv. fuer Ophthal.*, Vol. 79. Part 3). (A) *Enlargement of the Blind Spot in Disease of the Accessory Sinuses.* 1. Disease of the posterior

nasal sinuses endangers the optic nerve (retinal). Slight ocular changes, particularly enlargement of the blind spot, often occur.

2. Affections of the anterior sinuses are much less apt to involve the nerve. When such do occur, circulatory disturbances probably play a role.

3. Affections of the optic nerve may, however, be expected in cases with abnormal extension of the anterior sinuses.

4. Affections of the nerve may follow non- or slightly purulent affections; in fact, thickening of the mucosa with scanty pus formation threatens the most danger.

(B) *The Dangers Accompanying the Operative Treatment of Sinus Disease.* The author observed the following complications after a Killian operation: Transitory optic neuritis with contraction of the visual field, epiphora, dacryocystitis, diplopia, and erysipelas leading to retrobulbar infiltration. The neuritis is attributed to an edema or hemorrhage about the nerve, the epiphora to kinking of the sac during the operation, the dacryocystitis to infection from the nose, the diplopia not to a trochlearis palsy, but to altered relations of the orbital contents. The case terminated favorably with good vision in each eye.

It seems that the Killian operation is especially liable to cause ocular complications when the posterior sinuses are also diseased.

(C) *Contraction of the Peripheral Visual Field Without Fundus Changes in Affections of the Posterior Sinuses.* In 83 cases this complication occurred but five times and two of these cases were questionable. It is possible that more cases would have been found had the color fields been investigated.

(D) *Retinal Changes, the Sequelae of Affections of the Posterior Sinuses.* In four cases he observed well defined changes in the peripheral retinal pigment, consisting of small, very black pigment masses, closely approximated and not sharply differentiated from the normal retina, the fundus picture simulating that of retinitis pigmentosa. A. C. S.

Van der Hoeve's Symptom and Ring Scotoma of Nasal Origin.

GJESSING, Drammen, Norway (*Graefe's Archiv, fuer Ophthalm.*, Vol. 80, Part 1), reports the following case: A pre-

viously healthy young man of healthy parentage became almost totally blind within six months because of optic atrophy. Associated symptoms included color blindness, bilateral concentric ring scotomata, which changed in shape and position as the case progressed, facial paresis, increased right patellar reflex, absent right Achilles' reflex and bilateral empyema of the posterior ethmoidal cells. Some improvement followed drainage of these cavities.

He suggests a beginning disseminated sclerosis or a hysterical tendency as possible, but not very probable causative factors of the ring scotomata in this case. As to a sinusitis being the cause not only of the optic atrophy but also of the ring scotomata, he alludes to very similar cases reported by Wood and Ham. The latter found several concentric ring scotomata which changed their form with the onset of convalescence. He considered them of functional origin, a view to which Gjessing inclines. A. C. S.

Concerning Enophthalmos Traumaticus With Formation of a Varix in the Lower Lid.

EVERBUSCH, GUSTAV, Munich (*Klin. Monatsbl. fuer Augenheilkunde*, May-June, 1911), reports an interesting case of enophthalmos, occurring in a twenty-eight-year-old man, due to the excessive exertion and strain incurred in trying to guide a heavily laden wheelbarrow on a wager over a circular course. The patient experienced intense pain immediately upon completing his task, having a sensation as though something had been torn in back of his eye. On the same day the patient noticed that the left eye was much deeper in the orbit than its fellow. The pain recurred to a lesser degree off and on for a number of days. Somewhat later it was noticed that he had a compressible swelling of the lower lid after bending forward or upon compressing the jugular vein, disappearing in the normal position.

The author quotes the literature on the subject, and concludes that the enophthalmos is largely due to rupture of the fasciculi attaching the ocular muscles and perhaps the capsule of Tenon to the periosteum of the orbit. The varix he thinks is due to the lack of valves in the orbital veins, allowing them to overstretch when subjected to greatly obstructed blood circulation. F. K.

Caustic Burning of the Eye by Means of Sodium Aluminate.

LEWIN, L., Berlin (*Klin. Monatsbl. f. Augenheilkunde*, May-June, 1911), reports two cases of severe burning of the eye by means of sodium aluminate. He believes that the solutions of this salt are caustic to the same extent as the equally concentrated solution of caustic soda. F. K.

Sudden Unilateral Blindness Following a Perforating Injury of the Skull Through the Mouth.

BIRKHAUSER, Basel (*Klin. Monatsbl. f. Augenheilk.*, July, 1911). The injury resulted from a pipstern which was driven with great force through the gums between the teeth. Immediate blindness of the right eye ensued. A radiograph of a sound passed into the opening showed the track of the wound directed upwards and backwards for 15 cm. along the median wall of the antrum. The pupil was round and reacted to direct and consensual light stimulus. Tension normal. The peripapillary region was occupied by a map-like white area. There were scattered hemorrhages over its surface. The macula was intact. The left eye was normal. In about a month's time the papilla became atrophic. The author placed the lesion of the optic nerve between the chiasm and the position of entrance of the blood vessels into the nerve and within the orbit. The opacity in the fundus was attributed to a rupture of the posterior ciliary artery. W. Z.

Concerning Caustics and Remedies Causing Inflammation of the Eye.

LEWIN, L., Berlin (*Klin. Monatsbl. fuer Augenheilkunde*, May-June, 1911), divides the agents having caustic or irritating properties into two main classes: (A) Those in which there is quick action, resulting in visible primary disturbances. These are called caustics, and are divided into further sections as follows:

1. Agents having the power to *coagulate* albumen, producing acid sloughs, namely, acids, metallic salts, halogens, alkaline earths, and many synthetic products of the organic groups—phenols, cresols, etc.

2. Agents having the power to *liquefy* albumen, producing soft eschars. To this group belong alkalies of a certain strength, many metallic oxides, oxide of mercury, zinc chlorid, etc.

The second principal group (B) includes those agents which are slower to action and have no visible primary action upon the chemical tissue growth. These the author terms inflammatory agents. All mineral or animal matter, including products of the destruction of albuminoids in the body are grouped in this class.

The principal point in the first division is that the acids cause coagulation so quickly, that the effect of the necrosis is to limit penetration. Thorough and immediate washing will greatly limit the depth of the eschar. In the second group there is no immediate necrosis, but rather an absorption of the alkali by the albumen. This forms no barrier to deep penetration, as every particle of alkali albumen carries the poison to the unaffected parts. Every affected part is practically destroyed, as it can never functionate again.

The exact action of the poison of the third group is not clearly understood. The albumen are not apparently altered thereby, but there is an outpouring of blood to the affected area, an accumulation of fluid, and a process of increased functioning of various tissues with eventual secondary chemical alteration of the tissues.

F. K.

Prophylaxis and Therapy in Ophthalmia Neonatorum.

HOERDER, A., Charlottenburg-Kirchstrasse (*Muench. med. Woch.*, August 1, 1911), reports not a single case of early infection in 1,757 infants treated prophylactically with five per cent sophol. The drug proved much less irritating than silver nitrate, conjunctival irritation occurring in only 2.2 per cent of the cases. Fresh solution, however, should be employed, formalin being set free in solutions left standing for some time. To prevent late infections mothers should be instructed regarding the importance of cleanliness in their relations with the newborn. Bleno-lenicet ointment gave favorable results in non-specific cases. The discovery of gonococci, however, calls for treatment with silver.

A. C. S.

Syrgol in Conjunctival Inflammations. (Especially Gonorrhoeal Conjunctivitis.)

HEGNER, C. A., Jena (*Muench. med. Woch.*, August 8, 1911), finds the instillation of 5 per cent syrgol, two to six times daily, extremely efficacious in the treatment of gonor-

rheal affections of the conjunctiva, causing rapid diminution in the number of gonococci and abatement of the inflammatory symptoms. A. C. S.

Histological Investigations Concerning the Action of Finsen Light, Expression and Copper in Trachoma.

HEIBERG AND GROENHOLM, Copenhagen, Helsingfors (*Græfe's Archiv. fuer Ophthal.*, Vol. 80, Part 1), conclude that the histological investigations in connection with the Finsen light treatment of trachoma in the main have led to the same conclusions reached by clinical observations. Finsen light exerts a marked detrimental influence upon trachomatous infiltration, a favorable result being obtained after a comparatively short period of exposure. A comparison between the histological structure of the conjunctiva after Finsen therapy with the conditions observed after expression and bluestone shows that Finsen therapy is far superior to the methods usually employed in the treatment of this disease. A. C. S.

Finsen Therapy in Trachoma.

GROENHOLM, V., Helsingfors, Finland (*Græfe's Archiv. fuer Ophthal.*, Vol. 80, Part 1), arrives at the following conclusions: The short wave light rays employed after the manner of Finsen-Lundsgaard cause destruction of the trachoma granules and disappearance of the trachomatous conjunctival infiltration.

After exposure a rather marked inflammatory reaction ensues with pseudo-membrane formation on the conjunctiva. These symptoms may last a week. After the swelling subsides the mucosa presents a smooth, blanched aspect or it may appear brilliant white and exhibit cicatrices. The scar formation, though extensive, is superficial and delicate, coarse cicatrization being exceptional. The shrinking process in the conjunctiva after Finsen treatment is no more pronounced than after the usual methods (expression and copper).

A cure often follows a single exposure of about ten minutes; in some two to three treatments are necessary; in a very few number of cases are more than six exposures required.

With this method the duration of treatment is considerably shortened. If expression precede the light treatment, the duration may be but a month.

The results of treatment: In 98 trachomatous eyes in which

the primary result was studied, 79 appeared free from disease and 19 improved, at the end of treatment. In 60 eyes in which observations were made twelve to seventeen months after cessation of treatment, there were noted 36 cures, 21 relapses and 3 failures.

Relapses occurred comparatively seldom in eyes in which at the beginning of treatment conjunctival shrinking was either absent or slight (the width of the upper conjunctiva 35 mm. or more; that of the lower 26 mm. or more); in other words, in eyes in the incipient stage of trachoma. In very advanced cases relapses were noted in 45 to 56 per cent. The most favorable results occurred in those in which only the fornices were affected, less favorable results occurring where the tarsal conjunctiva was also involved. In the advanced cases in which the disease confines itself to the tarsal conjunctiva, the most relapses occurred (44 per cent.).

The granular and papillary forms of trachoma seem to be about equally influenced by Finsen therapy.

This treatment is unfortunately not free from danger, panus and corneal ulceration sometimes being produced. In most cases, however, these were noted to follow where the cornea was affected prior to the treatment, excepting seven in which the cornea was healthy at the beginning of the treatment. In three eyes vision was impaired.

The Finsen treatment is therefore principally indicated in trachoma without corneal complications. In such cases the greater portion or the whole palpebral and retrotarsal conjunctiva may be treated at one sitting. In trachoma with corneal involvement and much irritation only a portion of the conjunctiva should be treated at one sitting, the next treatment not being resorted to until the subsidence of the inflammatory reaction.

The treatment may be employed in conjunction with other forms of treatment.

He considers the Lundsgaard-Finsen treatment of trachoma in many ways superior to former methods and a most valuable contribution to the therapy of this widespread and dangerous disease.

A. C. S.

The Fastening of the Ocular Muscle in Advancement Operations.

OHM, JOHN, Bottropi W. (*Klin. Monatsbl. f. Augenheilkunde*, May-June, 1911), makes the usual separation of the

muscles to be advanced and ties the same to corneal margin with sutures. These sutures are reinforced above and below by sutures tied to the muscle to be advanced near its edge and carried under the conjunctiva and tied to the interior and superior recti, respectively, which have been exposed for the purpose. F. K.

The Treatment of Trachoma and Follicular Catarrh by Means of Quartz Light.

MOHR, TH., AND BAUMN, G., Breslau (*Klin. Monatsbl. fuer Augenheilkunde*, May-June, 1911), have found that the treatment with quartz light is especially adapted in fresh cases of trachoma and in persistent cases of follicular catarrh. If carefully used there is no danger to the lids or adnexa, the cornea being protected by a metallic shield.

The results are good in selected cases in which sufficient penetration of the rays of light can be secured. F. K.

Local Anesthesia in Exenteration and Enucleation of the Bulb.

MENDE, EDWIN, Berne (*Klin. Monatsbl. fuer Augenheilkunde*, May-June, 1911), believes that local should be substituted for general anesthesia whenever possible, on account of ease of application and lack of danger in enucleation and exenteration of the eye.

He uses the method of Siegrist, which consists of the injection a one to two per cent cocain adrenalin or novocain adrenalin solution, by means of a syringe equipped with a curved needle.

After thorough cocainization of the conjunctiva an injection of 2 cc. of a one or two per cent cocain or novocain adrenalin solution is made into the temporal side and one on the nasal side of the eyeball in the neighborhood of the optic and ciliary nerves.

It is well also to apply 1 cc. in the neighborhood of the straight ocular muscle insertions.

In 118 enucleations made in this way, 89 were painless, 23 had little pain, 6 had much pain. In 4 cases there was vomiting. There was no cases of collapse or death.

The contraindications are: 1. Badly damaged traumatic eyeballs. 2. Hypersensitive individuals and children, in whom

psychic impulses would do harm. 3. In panophthalmitis with penetration or in purulent conjunctivitis when there is danger of carrying infection into the orbital tissues. F. K.

A Modification of Siegrist's Method for Local Anesthesia in Exenteration and Enucleation of the Eyeball.

SEIDEL, E., Heidelberg (*Klin. Monatsbl. f. Augenheilkunde*, September, 1911). Seidel's method consists in the dropping of a ten per cent solution of cocain into the conjunctival sac, at intervals of one minute for five instillations. Then 1 to 2 cc. of a one per cent solution of novocain (to which has been added five drops of adrenalin solution to 10 cc. of a novocain solution) is injected under the conjunctiva circumcorneally at a distance of 4 mm. from the limbus. The lids are closed and light massage made to favor the absorption. Then a straight needle 5 cm. long is thrust above, below and to the temporal and nasal sides, over the muscle insertions, injecting 2 cc. of the anesthetic into the retrobulbar tissues.

Exophthalmos and edema of the lids follows this injection, but the patient is directed to lie down and apply a compress over the eye. After twenty minutes the eye is totally anesthetic and remains so at least for fifty minutes. The author believes that the refinements practiced by him make the operation absolutely painless. F. K.

Concerning Operation on the Eyeball After Resection of the Optic and Ciliary Nerves.

GOLOWIN, S. S., Odessa (*Klin. Monatsbl. f. Augenheilkunde*, September, 1911), states that it is well known that in absolute glaucoma the usual operation of sclerotomy, iridectomy, etc., are of no value in the relief of pain, and that the usual procedure is to enucleate. The retention of the eyeball is much more desirable, on account of its superior cosmetic appearance. The operation of resection of the optic and ciliary nerves, which always gives relief, is considered by the author as the most desirable. He finds that eyes that have been so treated are still amenable to further operative interference. The author performed a simple extraction and a combined extraction with iridectomy upon two eyes, respectively, with a normal healing. F. K.

A Plastic Operation for Restoration of the Lower Lid.

KOELLNER, Berlin (*Muench. med. Woch.*, October 10, 1911), describes a method for restoring the lower lid by means of a conjunctival tarsal flap obtained from the upper lid.

A rectangular flap including conjunctiva and tarsus (in size corresponding to or slightly wider than the defect) is dissected from the posterior surface of the everted lid, the lower border running parallel to and 2 mm. distant from the lid margin. This side forms the free margin of the flap, which is then drawn down over the eye and inserted into the defect in the lower lid and fastened by sutures, the upper retrotarsal conjunctiva becoming the new conjunctival covering for the upper lid. Pedicled skin flaps or preferably Thiersch grafts form the external covering of the new lid. Re-enforcing sutures may be necessary to keep the lids approximated and prevent the sutures from tearing out. An ointment dressing is applied and both eyes kept bandaged for 24 hours. On the seventh or eighth day the conjunctival bridge is divided and redundant conjunctival tissue trimmed away.

The writer has tried this method in two cases with excellent results. Only slight contraction followed and the upper lid showed no bad effects from the operation. A. C. S.

Contribution to the Question of the Effect of Salvarsan on Luetic Ocular Affections.

SEIDEL, E., Heidelberg (*Gräfe's Archiv. f. uer Ophthal.*, Vol. 79, Part 2), treated 12 cases (9 acute, 3 quiescent) of interstitial keratitis with intravenous and subcutaneous injections of salvarsan. In only two of the acute cases was no satisfactory result obtained. In one of these the other eye, too, became affected; in both, however, the disease ran a mild course.

No result was obtained or expected in the three quiescent cases where salvarsan was used as a prophylactic.

Six cases of iritis (2 acute, 2 relapsing, 1 chronic with plus tension, 1 non-luetic but with a luetic history) were also subjected to the treatment. In only the acute cases was a favorable result obtained.

In two cases of palsy of the ocular muscles no cure was effected. In a case of bilateral choked disk of doubtful etiology and one of old chorioiditis the only improvement noted was in the general condition. A. C. S.

Röntgen Ray Therapy in Sarcoma of the Lid.

TISCHNER, Freiburg (*Klin. Monatsbl. f. Augenheilk.*, April, 1911), shows by an illustrated article that we have in the Roentgen rays a suitable method of treating sarcoma of the lid which in accessible, controllable patients will give a high per cent of excellent results. It is particularly indicated in lid growths, because on account of the complicated structure of the lid only relatively good results are obtained from plastic operations. W. Z.

On the Treatment of Retinal Detachment by Operative Withdrawal of the Subretinal Fluid and Injection of Air Into the Vitreous.

OHM, J., Bottrop (*Gräfe's Archiv. fuer Ophthal.*, Vol. 79, Part 3), reports two cases in which he tried this method.

In the first there was a detachment secondary to cataract extraction of about three months' duration. Vision fingers in four meters; under conservative methods temporary improvement to 4/18.

Operation.—A meridional incision was made 6-7 mm. down and in from the limbus after dissecting away a conjunctival flap. Through this opening a large canula of a Pravaz syringe was introduced and 6½ graduations of fluid aspirated. Through the same opening a fine canula was then inserted and 1 cm. air injected into the vitreous, air bubbles subsequently appearing behind the pupil and in the anterior chamber. Immediate improvement in tension followed. Three days later the retina appeared reattached. No inflammatory reaction supervened. Eleven days after the operation corrected vision equaled 4/18. Four months later this improved to 4/12.

In a second recent case of detachment after attempting to cure by the usual non-operative methods, the above operation repeated thrice at intervals of three to four weeks proved partially successful after the first attempt, but the improvement was of short duration, and after the last procedures vitreous opacities developed.

The operation therefore is still on probation. From the results obtained so far, he suggests gradual withdrawal of fluid best accomplished by direct puncture with a fine canula. The retina should not be injured. The air canula, however,

must be passed through the retina. To prevent further detachment this puncture should be made at a point outside of the detached area.

A. C. S.

The Therapy of Serous Cysts of the Iris.

SCHOELER, FRITZ, Berlin (*Klin. Monatsbl. f. Augenheilkunde*, May-June, 1911), relates the histories of two cases in which the disappearance of the cyst was brought about by the careful injection of a few drops of tincture of iodine into the cyst by means of a Pravaz syringe. Four years later no trace of the cyst could be seen.

F. K.

A New Operation for Pseudopterygium.

STEINER, Surabaya, Java (*Klin. Monatsbl. f. Augenheilkunde*, April, 1911), describes an operation suitable for cases of pseudopterygium such as occur in advanced trachoma in which the conjunctiva is dragged over onto the cornea. The membrane is dissected carefully off from the cornea and the separation from the sclera is carried down to the fornix. In the depth of the fornix, behind the membrane, a frontal incision is made which deepens the cul-de-sac to the orbital margin. The dissected conjunctiva is then turned so that it forms a continuation of the palpebral conjunctiva. The free margin which was upon the cornea occupies the bottom of the cul-de-sac. It is fastened here by sutures brought through onto the skin at the orbital margin. When the pseudopterygium occupies the fissural area it is split horizontally and one half transplanted above the other half below.

W. Z.

A Contribution to the Technic of the Operation for Secondary Cataract.

LEVINSOHN, GEORGE, Berlin (*Klin. Monatsbl. f. Augenheilkunde*, May-June, 1911), reports the use of his sickleshaped knife for dissection in secondary cataract and iridotomy in about 113 cases in the hands of himself or colleagues. It has served very satisfactorily on account of the better cutting surface presented and less pulling upon the ciliary body.

F. K.

ABSTRACTS FROM FRENCH OPHTHALMIC LITERATURE.

BY

CLARENCE LOEB, M. D.,

ST. LOUIS,

AND

M. W. FREDERICK, M. D.,

SAN FRANCISCO.

The Treatment of Dacryocystitis.

DEJOUANY, M. A., Tunis (Du traitement des dacryocystitis; *Gazette des Hôpitaux*, 1911, Vol. LXXXIV, p. 1567), states that the various conditions following a stricture of the nasal duct are simply steps in the development of a dacryocystitis. He divides the lesions into two, for the sake of discussion: catarrhal dacryocystitis, and phlegmonous dacryocystitis. The treatment of the former consists in: (1) reestablishment of the lacrimal passages by dilatation of the canaliculi, their incision, probing, lavage of the sac, and its extirpation if necessary; and (2) treatment of the diseased mucosa, the conjunctiva, sac and nose. In the treatment of the phlegmonous variety, it is better to incise the sac without waiting for a fistula to form. C. L.

What Is Meant by the Meter Angle?

CAMPOS, Cairo (Que faut-il entendre par angle métrique? *Revue Générale d'Ophthalmologie*, 1911, Vol. XXX, p. 337), states that there are two different conditions understood by the meter angle: (1) The accommodation meter angle, or meter angle of Nagel, which means the angle of convergence necessary to fix an object upon the median line at 1 meter distance from the center of rotation of the eyes, i. e., 1 meter angle corresponds to 1 diopter of accommodation. (2) The decen-

tering meter angle, which means the angle of convergence necessary to fix an object lying upon the median line at one meter distance from the middle of the basal line. It is represented by a lens of 1 diopter decentered by an amount equal to half of the basal line. This is the conception of most French authors.

C. L.

Diabetic Iritis.

CAZALAS (Iritis diabétique, *Thèse de Toulouse*, 1910; abst. *Rev. Gén. d'Ophtal.*, 1911, Vol. XXX, p. 358) states that this is a rare affection, when purely of diabetic origin. The cases of iritis from other causes, appearing in a diabetic are much more numerous. In either case, the diabetes renders the patient more subject to attacks of glaucoma. Therefore in combating the iritis, the use of atropin must be guarded. The patient should be kept under the most careful observation, and at the first signs of hypertension the atropin must be replaced by eserine.

C. L.

Traumatic Myopia.

BARSALOU (Contributions à l'étude des myopies traumatiques, *Thèse de Toulouse*, 1910; abst. *Rev. Gén. d'Ophtal.*, 1911, Vol. XXX, p. 366) states there are four forms of traumatic myopia, with transitional forms: (1) myopia from spasm of accommodation; (2) myopia from relaxation of the zonula; (3) myopia from luxation or subluxation of the lens; (4) myopia from elongation of the axis of the globe. The gravity of the condition increases from (1) to (4).

C. L.

Gun-Shot Wounds of the Orbit.

BELLEFOX, MERIE DE (Essai sur les coups de feu de l'orbite, *Thèse de Paris*, 1910; abst. *Rev. Gén. d'Ophtal.*, 1911, Vol. XXX, p. 371) states that the lesion rarely involves the eyeball itself, consisting usually of intra- and extraocular hemorrhages, fracture of the orbital walls, lesions of the retrobulbar nerves, muscles and blood vessels, especially the optic nerve. The extraction of the ball is difficult and unnecessary, as its presence is well tolerated.

C. L.

Conjugal Tabes.

VALLES (Tabes conjugal. De l'importance des manifestations, oculaires, *Thèse de Toulouse*; abst. *Rev. Gén. d'Ophtal.*, 1911, Vol. XXX, p. 379) states that whether or not syphilis is

the cause of tabes, it is frequently found in the preceding history of these patients, rarely in both (16 times in 46), usually certain in the husband and only probable in the wife (26 times in 46). Even if syphilis cannot be demonstrated, there is always the possibility of its being unknown or concealed. The ocular symptoms are the same in conjugal as isolated tabes; however, paralysis of the external muscle is more frequent and severe in the husband, and motor incoordination in the wife. C. L.

Hemianopsia Dextra and Amanrosis Sinistra Following Cerebral Tuberculosis.

GRAVIER, LYONS (Hémi-cécité droite et cécité gauche par tuberculose cérébrale, *Revue Générale d'Ophthalmologie*, 1911, Vol. XXX, p. 433), reports a case of tuberculoma of the frontal lobe and the tuber cinereum with secondary involvement of the chiasm and left optic nerve, resulting in a nasal scotoma of the right eye and complete blindness of the left.

C. L.

A New Magnetometer.

GALLEMAERTS, BRUSSELS (Un nouveau modèle de magnétomètre, *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 497), gives to his new model a firm support by arranging the different parts on a marble base. Two small magnets are used, which are so arranged that by their adjustments the apparatus is regulated. The single needle is replaced by three small superimposed magnets, and the cell in which they oscillate is surrounded by a copper ring which regulates the oscillation. By means of this magnetometer he has greatly simplified the problem of magnetic intraocular bodies.

C. L.

Alterations of Descemet's Endothelium in Traumatic Iridocyclitis.

OPIN (Altérations de l'endothélium de Descemet dans une iridocyclite traumatique: morphologie et évolution, *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 501) studied these changes in an eye enucleated for iridocyclitis with secondary glaucoma. He found multiple and elective changes in the endothelium of the anterior chamber which corresponded to opacities and deposits on the posterior surface of the cornea, which had been observed before operation. The three points of interest are: (1) the nature of the cellular deposits on the posterior surface of the cornea; (2) the origin and evolution

of the cellular layer which lined a great part of the posterior surface of the cornea; (3) the curious degeneration undergone by the epithelial elements which had fallen into the anterior chamber.

(1) Contrary to Fuchs' belief, they are really cells from Descemet's membrane: (a) because the ciliary processes were completely atrophied, and there was no sign of lymphocytic infiltration at the ciliary processes or iris; (b) it would have been impossible for the cells to have passed through the fibrinous exudate and applied themselves to the posterior surface of the cornea—they must have originated at or near the place they were found; (c) their origin can actually be seen at the niveau of Descemet's endothelium; the cells are detached, project outward, segment and then fall into the anterior chamber. Sometimes they are in masses, the youngest cells of which are those closest to the endothelium. Consequently the clinical term of descemetitis is pathologically correct. (2) They are endothelial cells which have undergone a transformation into fixed, anastomosing cells. It is possible that they later secrete collagene, and thus form the connective tissue layer which Bartels saw. (3) The endothelial cells become vesicular owing to the presence of the serous or purulent secretion. Sometimes this forms around the nucleus; sometimes there is a formation of two nuclei; or there may be in addition karyokinesis; in fact, the different appearances can all be explained as the result of a process of karyokinesis, multiplying the number of nuclei, accompanied by cellular imbibition and vesicular alterations of the protoplasm.

The Action of 606 on the Eye and Ocular Affections.

BISTIS, J., Athens (De l'action du 606 sur l'oeil et les affections oculaires, *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 527), reports several cases so treated. In three cases of optic nerve affection, there was a decided improvement in one case and no effect in the other two. In a case of acute iritis, there was first an exacerbation of the condition, followed by an amelioration, but the patient passed from observation. In a case of anisocoria, there was no change following treatment. The author believes that 606 has no bad effect on the eyes, and that the changes found are due to the syphilis in spite of the drug.

C. L.

The Phenomenon of Composite Colors in the Eyes of Vertebrates.

CONSTENTIN, Geneva (Contribution a l'étude du phénomène de la couleur composée dans l'oeil des vertébrés, *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 532), by a series of graphics demonstrates that there is a graphic for each color sensation, and that it is very similar to the graphic of the simple color which it resembles. However, the composite colors are not identical with the spectral. Hence he concludes that the sensations correspond to physical phenomena and not to combination of sensations. C. L.

Chorioretinitis Traumatica.

PECHIN (Chorio-rétinite traumatique, *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 544) reports a case of traumatic chorioretinitis following a blow of a whip on the closed eye. Ophthalmoscopically, the macula was of a deep red color sprinkled with small grevish spots. These gradually collected into small pale areas, but the excentric vision increased. C. L.

Heredity and Zonular Cataract.

COLLOMBE, A., Geneva (Cataractes zonulaires dans deux et vraisemblablement trois générations de la même famille, *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 549), reports the history of a family where the condition was present in two and probably three generations.

The members affected were:

- I. Female—always a little nearsighted, probably cataract.
- II. Female—slight zonular cataract.
- III. (a) Female, age 20—unaffected.
(b) Female, age 18—slightly affected.
(c) Female, age 17—unaffected.
(d) Male, age 16—pronounced cataract.
(e) Male, age 15—unaffected.
(f) Male, age 13—pronounced cataract.

C. L.

The Influence of Traumatism in the Genesis of Interstitial Keratitis.

TERRIEN, F. (Valeur du traumatisme dans la genèse de la kératite interstitielle, *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 562), reports a case where an interstitial keratitis

developed in a patient with hereditary syphilis two days after he himself had removed a foreign body from his eye, and decides that this lesion had no influence upon the causation of the keratitis. He reviews the cases that have been published, 93 in all, and finds that hardly a dozen of them can show any causal connection between the injury and the subsequent lesion, and one-half of these can be excluded on account of their being bilateral affections. C. L.

Lesions of the Optic Nerve and Chiasm in Multiple Sclerosis.

VELTER, E., Paris (Recherches sur les lésions des nerfs optiques et du chiasma dans un cas de sclérose en plaques, *Archives d'Ophthalmologie*, Vol. XXXI, p. 585), reports the case of a patient 28 years old who died of multiple sclerosis. During life, the right eye showed a slight discoloration of the disk, while the left showed an advanced optic atrophy. Summed up, the results of the histologic examination are:

(1) The sclerosis of the optic nerve and chiasm is a disseminated neurogleic sclerosis, accompanied by an interfascicular connective tissue sclerosis of the optic nerves.

(2) The perivascular lesions (sclerosis, thickening and infiltration) appear around the central vessels.

(3) There are deep alterations of the myelin sheath, at the level of the sclerotic areas. There is no generalized ascending or descending degeneration.

(4) The cylinders are not entirely degenerated: but though they are for the most part conserved at the level of the sclerotic areas, they in places show very important changes.

This lesion of the myelin sheath with relative integrity of the axis cylinders is characteristic of multiple sclerosis, and differentiates it from other forms of optic atrophy. C. L.

The Divisions of Trachoma, Its Treatment and Complications.

MACCALLAN, A. F. (Les divisions du trachome, le traitement de cette affection et de ses complications, *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 600) divides trachoma into four stages:

I. Small grayish or grayish yellow irregularities on the tarsal conjunctiva or in the cul-de-sac, resembling sago granules. There may be a complication by infection with germs of other diseases.

II. (a) Gelatinous granulations, either isolated or as a general infiltration, scattered over the tarsus and cul-de-sac.

(b) Formation of pseudopapillæ, which more or less mask the typical granules. It is especially marked over the upper tarsus, and may be confused with vernal catarrh.

III. Commencement of cicatrization, with retraction of new formed tissue and crushing out of granules.

IV. Conjunctiva smooth, with white lines indicating the connective tissue. The trachoma is cured. This is the general course, though there are variations from the typical course.

The treatment varies with the stage:

I. Nitrate of silver, if there is secretion, otherwise, a collyrium three times daily of zinc sulphate 0.5, bichlorid of mercury 0.02, aquæ destil. 10.0.

II. Mechanical by curettement, aided by medicinal, bichlor. of mercury 1 per cent to 2 per cent to the bleeding surface.

III. In the beginning, daily instillation of 1 per cent bichlorid of mercury, later this may be changed to copper sulphate. Areas of necrosis should be opened with a Beers knife, followed by dressing with 1 per cent bichlorid.

Treatment of the trichiasis and entropion—preliminary rules:

(1) Always hold the lid with a Jäger's spatula; never with a Snellen's clamp.

(2) Never lift up the skin of the lid.

(3) Never use silk sutures; always catgut.

(4) Use local anesthesia with adrenalin except in patients under 15 and nervous ones.

(5) Always cut the cilia of the operated lid, except in trichiasis with the cilia directed inwards.

(6) Always treat the conjunctiva for several days before the operation.

(7) Never make a partial operation.

(8) In operating hold the patient's head behind.

(9) If the conjunctiva is completely cicatricized, there is no danger in causing a slight ectropion.

The following operations are used:

(1) Snellen's operation, (2) the operation of Anagnostakis on the upper and on the lower lids, (3) Van Mellingen's transplantation, (4) electrolysis, (5) the combined excision of Heisrath. These are explained in detail. C. L.

The Diagnosis and Pathology of Lenticonus Posterior in Man.

GOURFEIN-WELT, MME. L. (Le lenticone postérieur chez l'homme, son diagnostic et sa pathogénie, *Archives d'Ophtalmologie*, 1911, Vol. XXXI, p. 625), enucleated the eye of a patient on account of its excessive enlargement and consequent pain. In addition to inflammatory and degenerative changes in other ocular structures, the lens had assumed the shape of a small mushroom and was calcified. The nucleus was in its normal position. The anterior cortex measured antero-posteriorly 1.7 mm.; the posterior cortex, which formed the cone, measured 3.5 mm. in the same direction. The substance of the lens was permeated by black corpuseles of different size and form. The lamellæ of the lens were directed forward and then backwards, paralleling anteriorly the surface of the nucleus, but posteriorly they were directed backwards in an obtuse angle to form the cone.

After reviewing the 20 cases which she was able to find in the literature, the author draws the following conclusions:

The diagnosis of posterior lenticonus in the living is difficult but may be made by the coexistence of the double refraction and the irregularity of the image formed by the posterior surface of the lens. In doubtful cases, the congenital origin and a posterior polar cataract speak in favor of lenticonus. The lesion is a congenital anomaly, caused by a persistence and thickening of the hyaloid artery following intrauterine inflammation, and the ophthalmoscopic and anatomo-pathologic absence of the artery is no proof against this theory of the origin of the lesion. Other inflammatory conditions, e. g., retinitis proliferans, may take a part in its production. C. L.

Dacryocystitis of the Newborn.

FAGE (La dacryocystite des nouveau-nés, *Archives d'Ophtalmologie*, 1911, Vol. XXXI, p. 650) thinks this condition is not so rare as is supposed. The cause is some arrest of development or occlusion of the inferior meatus of the nose or the nasal canal. Though the obstruction may be of an inflammatory nature, it is probably never due to blennorrhea neonatorum. Three to four weeks after birth a tumor is noticed in the internal angle of the eye, and this may be accompanied by pain and redness. An incision yields pus. It may disappear spontaneously. Treatment consists in expression, probing and incision if necessary, and medicinal. C. L.

The Development of the Iris and the Anterior Chamber in Man.

COSMETTATOS, G. F., Athens (Recherches sur le développement de l'iris et la formation de la chambre antérieure chez l'homme, *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 655), made examinations upon embryos of 3 mo., 4 mo., 5 mo., 6 mo., 7 mo., 8 mo., 9 mo., at birth and 1 yr., and gives his results in an article too long for abstracting. In brief, after the intercrystallo-corneal embryonal mesoderm is formed, it differentiates into two parts, the anterior of which forms the cornea and the posterior the pupillary membrane. The space between these becomes the anterior chamber, which is thus formed very early in embryonal life. C. L.

A Case of Uremic Amaurosis in a Pregnant Woman.

LAGRANGE (Un cas d'amaurose urémique chez une femme enceinte, *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 675) reports a case of this rather rare condition, which resulted in complete loss of peripheral vision, with retention of 5/6 vision centrally. The blindness came on in the seventh month of pregnancy, at which time albumin was found in the urine, but the patient did not come to the hospital until the time for her delivery at term. She was not seen by Lagrange until 8 months later, at which time no lesion of the retina, disk or any other part of the eye was found, only the visual fields' contraction was present. C. L.

Spontaneous Total Resorption of Senile and of Traumatic Cataract.

CHAUVIN (De la résorption spontanée et totale de la cataracte sénile et de la cataracte traumatique, *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 683) reports one case of the former and two of the latter. During the operation for senile cataract, the lens was dislocated backwards into the vitreous where it was subsequently completely absorbed. The first traumatic cataract was in a young man of 21, and the second in a child of 2½ months. C. L.

Steresol in Ocular Therapeutics.

DOMEC, Dijon (Quelques applications du stérésol en thérapeutique oculaire, *La Clinique Ophthalmologique*, Vol. XVII,

p. 282, June, 1911). Steresol is a varnish composed of ben-zoin, tincture of tolu, carbolic acid, ethereal oils, shellac, and saccharin, dissolved in alcohol. So far it has been used in this country for painting on diphtheritic false membranes, but Domec has extended its use to several eye conditions, notably vernal catarrh, follicular conjunctivitis, trachoma, and infected corneal ulcers. After applying the remedy over a thousand times he asserts that its use does not cause much pain, a slight burning sometimes persisting for 24 hours. The eye is first cocainized and the upper lid is given a double turn. The steresol is applied by means of a metallic rod, preferably a Bowman's probe, in a very thin layer. In about two minutes the sharp sensation of burning has passed, and the steresol is dry; the lid is then turned down, when another burning sensation is felt, which also disappears in a few minutes. In 5 to 10 minutes the patient is allowed to open the eyes, or, if deemed necessary, a bandage is applied until the next application of steresol on the following day.

In two cases of trachoma cited, each of which was treated for a month, the vision was decidedly improved, and no recurrence took place in 10 years in one case, and in 7 years in another. Both these cases had been subject to recurrences, and had been treated in several of the usual ways. As trachoma is not of frequent occurrence in Dijon, Domec asked a military surgeon in Algeria to verify his results, and from him received the most encouraging reports on the efficacy of the remedy. In a most intractable case of vernal catarrh the 13-year-old patient was able to resume his studies after a month's treatment; but even a subsequent month's treatment did not remove the hypertrophy of the papillæ, although the patient was able to use his eyes in comfort, which he had not been able to do for a long time. In one case of vernal catarrh complicated with corneal ulceration and dacryocystitis, in which the loss of the right eye seemed imminent, the result was remarkably good. Out of 10 cases of bad ulcers of the cornea, due to mortar or iron rust, 9 were cured in 10 days; in the tenth case a large paracentesis of the cornea was necessary before the eye began to heal. In serpiginous ulcers the results were nil.

M. W. F.

**Corneal Opacity Following Cataract Extraction, Due to Lack of
Re-establishment of the Anterior Chamber, and the
Remedy for It.**

LAKAH (De certaines complications qui surviennent apres l'operation de la cataracte, par suite du defect de rétablissement de la chambre anterieure et des moyens d'y remedier, *La Clinique Ophthalmologique*, Vol. XVII, p. 291, June, 1911) describes an opacity of the cornea which is sometimes observed after a successful cataract extraction when the anterior chamber has not been reestablished. This opacity is generally seen in the center of the cornea, and is caused by an anterior synechia, the lip of the iridectomy wound being the adhering point. This opacity may spread over the whole pupillary area, thus nullifying the operative result. It is probable that an alteration of the epithelial cells at this point allows the aqueous humor to enter and to opacify the cornea. Even when a tardy reestablishment of the anterior chamber has taken place this opacity will persist; there is then but one thing to do, namely, to go through the cornea with a lance-shaped knife close to the synechia, and then to break the synechia with a spatula or a fine blunt hook. One will be surprised to see these opacities immediately begin to clear up, even though they have persisted for a long time. If the condition is of recent standing the application of the actual cautery to the corneal wound and the use of atropin will often suffice. Lakah thinks the cautery restores the vitality of the cornea, the lack of which has allowed the iris to become adherent.

M. W. F.

**Spontaneous Luxation of Both Transparent Lenses Into the
Anterior Chamber.**

JACQUEAU, LYONS (Luxation spontanée dans la chambre anterieure des deux cristallins transparents, *La Clinique Ophthalmologique*, Vol. XVII, p. 298, June, 1911), relates a very interesting case of double luxation in a man of 32. The supposition of a congenital subluxation which has been overlooked will not hold in this case, as the patient had been under the care of several competent oculists. Until the age of 20 his vision had been considered normal by himself, when his sight began to diminish. Seven years ago he had a bad fall from a bicycle, after which he consulted Jacqueau, who found the vision of the right = 1/3 with — 11 \square — 4.50 cyl., ax.

180; and that of the left = $5/7$ with $-4.50 \text{ C} - 2.00 \text{ cyl.}$, ax. 180. What struck Jacqueau most at the time was the trembling of both irides. For three years the patient did well with this correction, when suddenly, while leaving his bath, he found the vision of the right eye much reduced. Five days later Jacqueau found the right lens lying in the anterior chamber, without any signs of irritation. Eserin was instilled, and the lens was delivered under general anesthesia through an incision in the lower part of the cornea two days later. The patient had, however, in the meantime, developed symptoms of acute glaucoma. Healing was perfect, but the glaucomatous attack had brought on a profuse hemorrhage into the vitreous which had not been absorbed at the time of reporting, but was beginning to clear up.

Two months later the left lens slipped into the anterior chamber while the patient was walking in the street. The next morning, under general anesthesia, the left lens was extracted, and the healing took place without incident. The vision of this left eye was much improved by the changed conditions, inasmuch as patient sees $1/2$ with $+9.00$ in spite of a central corneal opacity which he has had since infancy. He is now back to his work of sorter in a silk factory.

Jacqueau thinks the process can be explained by a gradual relaxation of the zonula, which increases until a complete rupture takes place. He takes as analogous the production of an inguinal hernia, where we have congenital weakness of the ligaments increasing until rupture ensues. M. W. F.

Isolated Injury of the Optic Nerve by Grains of Shot.

COSMETTATOS, Athens (Blessure directe et isolée du nerf optique par grains de plomb, *La Clinique Ophthalmologique*, Vol. XVII, p. 301, June, 1911), adds another to the somewhat seldom cases where a charge of shot having been received in the face, the globe has escaped uninjured but blindness has ensued through severing of the optic nerve. In the case described the left globe had been wounded and was atrophic, the injury being of fifteen months' standing. The right globe, however, was intact but blind, the nerve being completely atrophic. The retinal vessels were full, showing that the nerve had been injured behind the point of entrance of the retinal artery. He also recites a case of Dufour and Gonin,

in which a woman was scratching the left side of her forehead with a knitting needle: at this precise moment her husband tripped, and in trying to save himself from falling struck the knitting needle with his fist, driving it into the orbit through the upper lid just below the supraorbital margin. Complete blindness ensued immediately, and three weeks later there was optic atrophy. This case is cited to show that a rod when forced into the orbit of a dry skull from below upwards, or from outwards inwards, will engage in the optic foramen, whereas if it comes from the nasal side it will cross the track of the optic nerve between the globe and the optic foramen.

The lesion of the nerve may be partial, in which case there will result a scotoma and a partial loss of the field. In one case, that of Steindorf, a grain of shot was found embedded in the optic nerve.

M. W. F.

Oculomotor Paralysis After an Injection of "606."

TRANTAS (Paralyse de l'oculo-moteur commun apres l'injection de "606," *La Clinique Ophthalmologique*, Vol. XVII, p. 406, 1911) relates the history of a boy of 18 who received an injection of 0.45 cgr. of salvarsan in the interscapular region from a tube coming from Ehrlich himself. The chancre had been in existence three weeks at the time of the injection, and inguinal adenitis and roseola had already appeared. In four days the initial lesion and the exanthema had disappeared, the glandular swelling was gone at the end of a month, and the general condition of the patient was highly satisfactory. The eyes had been examined prior to the injection and found normal.

Eight weeks after the injection the patient began to suffer with headaches which were more severe at night. A week later complete ptosis of the left lid, followed in four days by paralysis of all the muscles supplied by the left common oculomotor nerve. Potassium iodid had no effect on the condition; potassium bromid eased the headache but was also ineffectual as regards the paralysis. When Trantas saw him six weeks later there was total ophthalmoplegia, a static refraction of +2.00, normal fundus, vision = 1/2. The right eye is emmetropic, and its vision = 1.00. Backward pressure on the left globe causes pain. A month's treatment with mercurials had no effect aside from increasing the range of accommoda-

tion slightly and causing the subsidence of a swelling of a retroauricular gland.

Although the serodiagnosis showed the presence of active syphilis, Trantas did not dare risk another injection of "606," believing the paralysis the result of the first injection. Oculomotor paralysis is extremely rare during the first months of syphilis; when precocious optic neuritis is found there is generally some good reason to account for it, such as alcoholism, senility, or some dyscrasia. M. Stern found 3 cases of paralysis of the ocular muscles amongst 5,000 syphilitics; whereas 200 syphilitics treated with salvarsan furnished 3 cases. Finger found 2 cases amongst 170 patients treated with salvarsan. These paralyses appear 2 to 3 months after the injection with sufficient regularity to suggest a casual connection.

M. W. F.

Parenchymatous Keratitis Treated With Salvarsan.

WICHERKIEWICZ (Les k ratites parenchymateuses trait es par le salvarsan, *La Clinique Ophthalmologique*, Vol. XVII, p. 394, 1911) tries to say a good word for salvarsan in the treatment of the keratitis of congenital syphilis, but his article is not very convincing, and he does not seem to have accomplished any more than the other investigators. Like others he finds that salvarsan will, in the acute and vascular cases, stop the blepharospasm, photophobia, and over-vascularization quicker than any other remedy. The improvement in vision was so slight in many cases that it might easily have been the result of the other remedies employed. The clearing of the cornea took place mostly at the periphery, the changes in the important pupillary area being slight. In one case, however, the vision improved from R. 0.50 ctm., L. 2.00 to R. 6/20, L. 6/10 inside of a month after two injections of salvarsan. Wicherkiewicz finds it more advantageous to give several small doses of salvarsan than one large one.

M. W. F.

A Study of the Bacteriologic Status of the Conjunctival Sac During Cataract Extraction.

DUCLOS (Recherches sur l' tat bact riologique de la conjunctive au cours de l'op ration de la cataracte, *La Clinique Ophthalmologique*, Vol. XVII, p. 411, 1911) has again taken up the flora of the conjunctival sac in 90 cases operated on in

Trousseau's clinic. According to Trousseau's practice these cases were not subjected to a preparatory bandage, but at the time of operation the skin and lids were cleansed with soap, and the conjunctival sac flushed with a 1/4000 solution of cyanid of mercury. After the cataract extraction the sac was again flushed with the cyanid solution, and the occlusive bandage applied, which was removed three to five days later.

Smears were made from the secretion at the inner canthus, and conjunctival fluid was collected on cotton pledgets mounted on very fine glass rods, which were immersed in bouillon by breaking the glass rods against the side of the bouillon tubes. After the lavage of the conjunctival sac another set of smears and bouillon cultures were made. A third set of smears and cultures were made after the opening of the bandage. If occasion warranted, more smears and cultures were made during the course of the healing. In those cases where inflammatory phenomena showed in the eyes animal inoculation was also practiced. From these studies Duclos draws the following conclusions:

Staphylococcus albus was found in every conjunctival sac. This did not interfere with the healing of the wound, even though the number of *staphylococcus albus* was uniformly greater after the removal of the bandage, and in 14 cases sufficient to soil the bandage. Inoculation into a rabbit's ear gave rise to a localized abscess or a redness of short duration. With one exception a club-shaped bacillus was found in all cases; in 10 cases *staphylococcus aureus* was present, 9 times *Morax diplobacillus*, 3 times Talamon-Fraenkel's pneumococcus, and once the Pfeiffer bacillus.

Antiseptic washes do not assure asepsis of the conjunctival sac, being indifferent in most cases. In about one-third of the cases the number of microbes was diminished, and the vitality of the pneumococcus found in smears and cultures after the operation was lowered. Strange as it may seem the bacillus subtilis, the bacillus perfringens, and a large undermined anerobic micrococcus was found in one case each, which were not present before the operation.

Two cases of serious infection occurred, in which the sac contained pneumococcus. In two cases where the inflammatory reaction was quite severe *staphylococcus aureus* was found. In a small number of cases that showed reaction, this

was attributed to some previously existing conjunctival or lacrimal trouble, the flora being the usual one. Again, in other cases where the usual flora was abundant, no infection of the eye took place, even though the wound was open or a hernia of the iris was present. The pneumococcus seems to be the especially virulent germ, as the author already demonstrated in 1905, when he gave a list of 9 cases of post-operative panophthalmitis, of which 7 were due to pneumococcus, and 2 to streptococcus.

M. W. F.

Double Purulent Congenital Dacryostitis, and Some Remarks Concerning Its Etiology.

CASSIMATIS, Alexandria, Egypt (Double dacryocystite congénitale et quelques considerations sur son étiologie, *La Clinique Ophtalmologique*, Vol. XVII, p. 417, 1911), relates a very instructive case of double purulent dacryocystitis occurring in a male child of four weeks. The child was apparently quite healthy in all other respects, but ever since the day of its birth a large amount of pus had been secreted by both eyes. Gonorrheal ophthalmia having been excluded, the lacrimal sacs were voided by digital pressure and argyrol instilled. Twenty days of this treatment having shown its futility, recourse was had to dilating and probing, which was, in turn, abandoned. A warm physiologic serum was then injected into one of the canals; the next day that eye was completely well. The same injection was practiced on the other eye, with marked improvement on the following day; a second injection brought about a complete cure. A month later the child was still well.

As to the explanation of this speedy result, Cassimatis thinks that there must be an abnormally large lacrimal sac and duct with an obstruction at the lower end. The latter renders the escape of the gelatinous substance which fills the lacrimal passages at birth difficult or impossible. This gelatinous substance is an excellent culture medium, and the staphylococci which invade the body openings at birth find all the conditions highly favorable for rapid and luxuriant growth. The injection of serum overcomes the obstruction and voids the lacrimal passage. With the culture medium gone the production of pus ceases.

M. W. F.

The Extraction of the Lens in Its Capsule.

MOREAU, M., of St. Etienne (De l'extraction du cristallin dans la capsule, *La Clinique Ophthalmologique*, Vol. XVII, September, 1911, p. 450), as a result of 33 operations has come to the following conclusions:

The operation is difficult and necessitates a long and "costly" apprenticeship. Loss of vitreous is the "bete-noire" of the procedure, and the means at hand for preventing it are insufficient. The other great danger, prolapse of the iris, when borne in mind, can often be averted. What we are greatly in need of is an indication of the probable behavior of the vitreous, and for this purpose all eyes are carefully measured with the tonometer of Schiötz; nevertheless, we must bear in mind that there are certain factors which change the attitude of the vitreous during the surgical intervention. It goes without saying that Smith's method is not applicable to unruly subjects nor to eyes with the slightest excess of tension, and that it is uncalled for in the extraction of overripe or Morgagnian cataracts.

One should not forget that Smith has been working in India, a country tolerant to surgical audacity, where the contra-indication is unknown. Tainted with "operative absolutism" his method can be transplanted to European soil only after having been purified by passing through the bath of social considerations. In India it is "everything or nothing." This must be taken into account to overcome the enthusiasm due to the excellent visual results of the Smith method. Moreau operates only on those patients in whom a satisfactory result has been produced in the other eye by the classical methods.

In operating Moreau uses a lid holder, believing the special hook used by Smith unnecessary; a blepharostat is never used. A large corneal incision is made, terminating inside of the limbus; the incision must be bloodless. The patient is then asked to look up, an assistant holding the lower lid drawn down with his index finger. Without fixing the globe a fine strabismus hook is applied perpendicularly to the globe until the lens is tipped forward. The amount of pressure needed to do this is subject to such variation that one must proceed very carefully, as some lens tip very quickly. As soon as the lens begins to tip, the handle of the hook is lowered, and the hook is slid upwards on the cornea in an oblique position. As soon

as the lens is delivered the hook is applied on the flat, so as to press the corneal lip against the posterior lip and imprison the vitreous. The lids are then closed quickly and a binocular bandage applied, which is retained for seven or eight days. During the entire operation the operator should have a spatula ready for instant use in his left hand. Should vitreous present after the presentation of the lens, the iris should be spread over the vitreous and the birth of the lens may proceed. The presentation of vitreous before the lens has begun to tip is of far more serious import, as the hook has to be abandoned and the tractor or spoon resorted to. When the lens is born in a horizontal position there seems to be less danger of vitreous loss than when the direction is oblique. The most dangerous moment is just as the lens is about to leave the eye, as a sudden change in the direction of the pressure is apt to rupture the capsule, obliging the operator to undertake the dangerous extraction of the ruptured capsule; even the most delicate manipulation of this capsule is apt to provoke a loss of vitreous. Even in such cases Moreau does not approve of an iridectomy, as the carefully replaced iris serves as a good retainer for the vitreous.

Of the 33 eyes operated on two had $V. = 1$; five $V. = 1/2$; eight $V. = 1/3$; nine $V. = 1/4$; three $V. = 1/6$; two $V. = 1/8$; three $V. = 1/10$; and one vision less than $1/20$. The last case was one of great vitreous loss, and two of the $1/10$ cases had serious loss of vitreous. Six cases of iridocyclitis gave poor visual results, but there was no case of delayed iridocyclitis observed.

In a number of cases the postoperative examination with the ophthalmoscope revealed pinkish spots in the penumbra when light was thrown on the iris; these spots owed their presence to the loss of pigment from the posterior surface of the iris, showing that the lens in its passage had scraped off patches of iridal pigment, something which never happens in the classic operation for cataract.

M. W. F.

The Treatment of Interstitial Keratitis With Tuberculin.

GODÉCHOUX, Amiens (De quelques cas de k ratite intersti ielle, leur traitement par la tuberculine, *La Clinique Ophtalmologique*, Vol. XVII, September, 1911, p. 460) tells us that 80 per cent of the cases of interstitial keratitis are due to

hereditary syphilis; when syphilis is not the cause it is most likely due to tuberculosis, as the role played by rheumatism, gout, influenza, malaria, the trypanosomiasis (including sporotrichiasis), is so small as to be negligible. While some of the patients give unmistakable symptoms of general tuberculosis, others have nothing to indicate it, or may present glandular enlargements, or the apex symptoms described by Grancher. The patients whom he treated with tuberculin had all been through a somewhat lengthy treatment with mercurials, so that syphilis could be excluded. A histologic examination and inoculation were out of the question on account of the injury which would have resulted to the eye from the excision of even the smallest piece of tissue. The tuberculin was obtained at the Pasteur Institute, and an injection made every second day, the abdominal wall being selected as the site of the injections at first, and later the gluteal region. The results were very good. Godéchoux strongly condemns the ophthalmic reaction of Calmette. M. W. F.

The Use of Essential Oils in Ophthalmology.

DUFAURE, 'Tunis (Les essences en ophtalmologie, *La Clinique Ophtalmologique*, Vol. XVII, p. 472, 1911) experienced the depressing feeling of inefficiency that most oculists have when they are transported to one of the breeding grounds of trachoma, but with true French courage and self-confidence he has sought a remedy which may dethrone the old-time therapeutic king, the blue stick, against which he has numerous grievances, such as its painfulness and the atrophy of the conjunctiva resultant from its immoderate use. He learned also, and this is a point which should be taken into consideration in appreciating the reports from those practicing amongst the Oriental nations, that the Arab shows a remarkable healing tendency, so that therapeutic results show a different coefficient from that usual amongst the Occidentals.

After a course of reasoning, the logic of which is debatable, Dufaure chose gomenol, a volatile oil from the leaves of *Melaleuca veridiflora*, a Myrtaceae found in New Caledonia near Gomen, as his weapon of choice, and a young woman with luxuriant granulations was the first subject. She had been treated without the slightest improvement with the usual remedies for two months. After cocainization the lids were

moistened with gomenol, and the excess carefully removed, except from the furrows, which were inaccessible. The patient left, suffering but little pain. She returned, however, four hours later, in agony. The pains lasted three days, but a week later the conjunctivae were smooth, and have remained so for two years, although the patient lives in a trachoma-infested family. In spite of this brilliant result Dufaure had not the courage to repeat the same treatment, but had recourse to:

Gomenol	1.00
Carbonate of guaiacol	0.30
Camphor	0.20
Olive oil, washed and sterilized.....	30.00

As the changes which probably take place in this mixture give rise in time to pain-producing products, he finally decided on the following:

Gomenol	1.00
Oil of lemon	0.25
Olive oil, washed and sterilized.....	30.00

The oil of lemon is vaso-constrictive and highly bactericidal. With this mixture he has had comparatively great success, and he claims that with the help of a collyrium of zinc sulphate, it will bring about a condition that resembles a cure, if, indeed, it does not effect a cure, in a greater percentage of cases than any other known remedy. Its virtue lies, furthermore, in the fact that it does not cause atrophy of the conjunctiva. Nor is its use limited to cases of trachoma; it acts as an excellent prophylactic in contagious eye diseases, no matter what their etiology. In one case of complete xerosis of both eyes repeated instillations of gomenol (or oil of Niaculi) afforded the previously blind patient sufficient sight to return to his home unaided.

Corneal opacities were lessened; this is not new, as many years ago infusion of cloves was tried in this country for this purpose, until we found better and neater substitutes in the synthetic products.

Dufaure warns against the use of his remedy in parenchymatous keratitis during the inflammatory stages, and also during acute pannus.

M. W. F.

Medical and Surgical Treatment of Trachoma.

JACOVIDÉS, Alexandria (*Traitement médical et chirurgical du trachome, La Clinique Ophtalmologique*, Vol. XVII, p. 479, 1911), gives the following combined method as his method of choice after an experience with 15,000 cases. With unimportant variations it is the method usual amongst the oculists practicing in Egypt. The upper lid is turned and seized between thumb and index finger, between which it is squeezed as hard as possible, the object of this is to bring out all the follicles that are hiding in the tarsus which is completely relaxed by this procedure. The upper lid is then given another turn so as to bring into view the fornix, and all follicles, granulations or papillary hypertrophies are carefully scarified. The same is repeated on the lower lid. Every trachomatous point is then gone over with Abadie's sharp curette until the characteristic scraping of the tarsus is felt, especial attention being paid to the fornices. After well irrigating the sac yellow oxide ointment is applied, and a moist bandage used for two hours. After that the eyes are washed every two hours.

On the following six to eight days the lids are touched with a 2% solution of silver nitrate until entire cessation of the secretion. Then he changes to 1 or 2% glycerite of copper sulphate. Thus in 15 to 20 days, sometimes in 10, complete cicatrization is attained, thus shortening the usual time of treatment greatly. In 8-10% of the cases there occurred relapses, or, rather, reinfections; in these cases the same method was again successfully used.

M. W. F.

ABSTRACTS FROM SPANISH OPHTHALMIC LITERATURE.

BY

WILLIAM H. CRISP, M. D.,

DENVER.

Expulsive Hemorrhage After Cataract Operation.

MONTANO, EMILIO F., Mexico (*Anales de Oftalmologia*, August, 1911), asks the following questions: 1. Is it possible to know in advance that a given patient is liable to this catastrophe? 2. If so, what should the oculist do? 3. If the danger cannot be foreseen and an eye has already been lost, what course should be adopted regarding the other eye, supposing that it also is cataractous? The accident is to be feared in frankly atheromatous cases; and in these it is therefore desirable to measure the arterial and the ocular tension, and also to bear in mind the size of the cataract and its degree of maturity, since the larger and riper the cataract the more abrupt will be the decompression when the lens is extracted, and the greater the risk of rupture of chorioidal vessels. Attempt should be made before operation to lower the arterial tension by saline purges or by bleeding, and by the use of iodide of sodium and lactate of calcium. Operation should be preceded by hypodermic injection of ergotin. The steps of the operation should proceed slowly, using a large corneal incision and iridectomy to favor easy expulsion of the lens. If the accident has already occurred with one eye, the above precautions should be followed in operating on the other.

Datura Arborea (Floripondio).

(*Anales de Oftalmologia*, September, 1911.) This article reviews work done in various sections of the Mexican National Medical Institute. The plant, native in South America, contains a small quantity of a substance which closely resembles atropin in its chemical properties, if it is not actually that

alkaloid. Instillation of the impure active principle of *datura arborea* causes a dilatation of the pupil, which begins in fifteen or twenty minutes, reaches its maximum in twenty-four hours, and disappears after five days. Interference with accommodation, and increase of intraocular tension, also occur. Therapeutically, a double or triple dose of preparations of floripondio is required to produce effects equal to those of belladonna. The drug may be used for the same indications as are satisfied by hyoscyamus or belladonna.

Ocular Disturbances from the Cinematograph.

GINESTOUS, ETIENNE (*Anales de Oftalmologia*, September, 1911). Cinematophthalmias result from ocular fatigue. Hence, we must understand what are or may be the elements in cinematograph exhibitions which favor the development of such fatigue. 1. The original negatives may have poor definition, which will be greatly accentuated in the enormous magnification (sometimes as high as 300 diameters) of the positives. 2. The principle on which the cinematograph produces its illusion of uninterrupted movement is that of persistence of the retinal impression resulting from each individual film. Since, as Charpentier has shown, the persistence of a luminous impression varies inversely as the size of the retinal image, the seats nearer to a cinematographic screen are less desirable than those more remote. 3. An excessive or insufficient luminosity may cause fatigue. 4. In order to obtain the regular alternation of images and eclipses the edge of the film is perforated by equidistant openings, by means of which the film is intermittently detained upon corresponding teeth. In the course of time, however, these openings become defective, the result being unsteadiness of the images.

Four Hundred Cataract Operations.

FINLAY, C. E., Havana (*Archivos de Oftalmologia*, August, 1911). This is a second series, the first having been published five years ago. The four hundred cases were divided into uncomplicated, 349, and complicated, 51. The operation consisted of simple extraction in 226 cases, in extraction with iridectomy in 168 cases, and in extraction after preliminary iridectomy in 6 cases. Since the figures for the three plans

of operation in the first series were 291, 99, and 10, respectively, the author has obviously tended away from simple and towards combined extraction. The author estimates his successful cases after simple extraction in uncomplicated cases at 92.5 per cent, and in complicated cases at 92.31 per cent. Combined extraction in uncomplicated cases gave 95.3 per cent of successes, and in complicated cases 89.42 per cent. The cases of extraction after preliminary iridectomy gave a successful percentage of 83.33. Loss of vitreous humor occurred in 4.26 and 5.88 per cent, respectively, of the uncomplicated and complicated cases. Expulsive hemorrhage occurred in a case of cataract with glaucoma. In 2.57 per cent of all cases there was late re-establishment of the anterior chamber; in 2.85 per cent grave postoperative infection; and in four cases postoperative glaucoma. Hernia of the iris occurred in 12.39 per cent of the simple, and in 1.78 per cent of the combined extractions. 159 dissections were done, with 96.94 per cent of successes.

Epithelioma of Lid Cured by Radium.

DEL MAZO, JOSE GARCIA, Madrid (*Archivos de Oftalmologia*, September, 1911). The patient, whose age was 54, gave a history of a small growth existing on the lower lid since twelve years previously. This had remained stationary in size for ten years, and had then grown rapidly, following repeated cauterizations with nitrate of silver. A large tumor was dependent from the lower lid and ala of the nose. There was almost continuous hemorrhage and the patient's general condition was deplorable. The preauricular and submaxillary glands were enlarged. After a microscopic diagnosis of pavement epithelioma had been made, applications of radium (nine centigrams of the bromide) were instituted. These were almost daily and lasted for from fifteen to twenty-two hours each. The eye was protected with lead. Treatment was suspended several times on account of marked local reaction and fever. In all, the treatment was used for 228 hours. The eyelashes fell out, but grew again. The lens subsequently became cataractous. Cure of the tumor was, however, complete, with but little scar; and after nine months the general health was good, and there was no sign of recurrence.

Cataract from Electric Discharge.

ORTIN, G. LEOZ, Madrid (*Archivos de Oftalmologia*, September, 1911). Two men on mules, and another on foot, received the shock of a sudden electric discharge as they were passing a pole which supported an electric cable. The first two, with their mules, fell to the ground unconscious. On coming to, vision was at first almost absent, but gradually returned. After this, however, the vision of one of them gradually got worse, and at the end of twenty-five days scarcely amounted to perception of light and dark. The second man experienced less disturbance of vision. Three months later, at examination, the first one showed complete cataract in the left eye; the right eye had some retinal disturbances, with vision 5/10. The second man had a stellar cataract in the left eye, with which his vision was fingers at 0.75 meter; and in the right a small anterior polar cataract had reduced vision to 5/35. Operation on the worse eye of the first patient resulted in vision of 5/15 with lens. Both men were lost sight of soon after this.

SOCIETY PROCEEDINGS.

BY

T. B. HOLLOWAY, M. D.,

PHILADELPHIA.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

A regular meeting was held October 16, 1911, with the President, Dr. H. W. Woodruff, in the Chair.

Blood-Staining of the Cornea.

Dr. W. A. Fisher presented a boy, aged eighteen, who was struck in the eye by a piece of iron or steel six months ago. He was treated for five weeks and advised to have the eye removed. When Dr. Fisher saw him there was little evidence of inflammation or irritation, but the cornea was of a dark-brown color, with a narrow zone of normal cornea at the outer edge. There was some discoloration of the iris and at the lower sclerocorneal junction, which looked as though it might have been caused by the entrance of iron or steel. The tonometer registered 62.5. Otherwise the eye was normal, as was the fellow eye. The use of the giant magnet proved negative. The Roentgen was negative. The band of normal cornea increased in width slowly until the edge of the pupil was visible. It is found to be two millimeters wide. It is impossible to say whether the lens is injured. Undoubtedly the trouble will clear up in time.

Discussion.—Dr. O. Tydings said that this was the first case of the kind he ever saw, and believed that these cases are very rare. In six months there has been a remarkable clearing of the cornea. As to the pathology, the rupture of Descemet's membrane without rupture of the cornea and the staining even after the cornea was ruptured he could readily

understand, because there might be closure of the external layers of the wound in the cornea, a condition which would be met with if Descemet's membrane alone had been ruptured.

Dr. Harry S. Gradle saw this patient two months ago and the condition has improved remarkably since then. It was difficult to say just what it was. There was a clear zone of cornea on the edge. It may have been hemorrhagic organic exudate from the anterior chamber. Why the blood in the cornea should assume this color when much the same condition exists in other cases, with unruptured Descemet's membrane, such as a green discoloration in multiple sclerosis—why there should be a different color here than there is difficult to say. In an unbroken Descemet's membrane it seems that the blood assumes a different tint, probably because it is a different reduction process, whereas in the ruptured Descemet's membrane this color is said to be dark brown. No explanation has as yet been given of this phenomenon.

Dr. Oscar Dodd presented a case before this Society a number of years ago. An intense staining was present. He also presented another case where it was a question whether the staining was due to a foreign body or to blood. It was the general opinion of the Society that it was due to the former. A foreign body was still in the eyeball. It had been in the sclera several months before it was removed. The cornea was stained very much, as in this case, and Doctor Dodd thought it was due to the metal and not to the blood.

Dr. G. F. Suker saw this patient several months ago, and the color was at least four shades darker than it is now. Therefore, it is quite probable that the cornea will clear up considerably more. Of greatest interest is the question as to how it got there. It is undoubtedly blood. Dr. Suker doubted that it is necessary to have a rupture of Descemet's membrane to have the blood there. It is undoubtedly an infiltrate. It may have gotten there in the same way that edematous conditions in a glaucomatous eye are caused. It must have gotten through the pectinate ligament. This is the only condition in which there is a passing of the aqueous humor into the cornea. This ligament starts in the posterior layers of the cornea and is a continuation of it. Therefore, it must have been injured and have had an opening large enough to

permit of this infiltration. In order to have an exudate of this shape, multiple ruptures of Descemet's membrane must occur, and it is doubtful if such took place. Descemet's membrane, when ruptured, and with this degree of infiltration, will not heal with a uniform surface. Therefore, again, it could only have gotten there by way of the pectinate ligament.

About two months ago Dr. Suker saw a boy whose entire iris was torn from the temporal side seven-eighths of the distance, one-eighth on the nasal side being intact. There was a little rupture of the cornea on the temporal side, and there was infiltration of blood into the cornea; inside of a week, however, it had disappeared.

Dr. Fisher, in closing, said that the singular thing about this case was its rarity, and yet with such an injury one naturally would expect to see more cases. Of course, in Dr. Dodd's case there was staining from the metal. There are many such cases in the literature.

Amblyopia With High Refractive Error Improved With Alternating Current.

Dr. W. Franklin Coleman reported the case-history of a girl of ten years with amblyopia associated with high refractive error, which improved markedly under treatment by the alternating current. The current (sinusoidal) was applied to the eyes and nape of the neck for fifteen minutes daily for three months. Vision was improved from 20/100 to 15/20. Glasses had been worn three years. Patient had accepted

O. D. + 1.75 Sph. \odot + 4.50, cyl. ax. 90°.

O. S. + 1.00 Sph. \odot + 3.50, cyl. ax. 90°.

No improvement by glasses. No evidence of hysteria.

Discussion.—Dr. G. F. Suker said that in small children, in whom high refractive errors usually appear, we should bear in mind that sight is not ocular, but mental, and that it depends on the images formed in the retina, to a certain extent, whether they are complemental. If low mentality is present, low retinal perception will prevail, to a certain extent. The cerebral center of visual interpretation can be stimulated by such means as Dr. Coleman has used. Therefore, if the retina be stimulated indirectly, the brain is stimulated and the images are clear, because the patient sees better. These patients with high refractive errors, as a rule, lack mental power

to maintain the accommodation necessary to overcome the refractive error. Any correction that will give a clear retinal focus or picture of the object looked at will give a better interpretation. By doing that, the fusion power is also improved. The visual acuity is increased and stereoscopic vision is stimulated. As soon as stereoscopic vision is increased, binocular vision is increased, and consequently perceptive power, and, in turn, visual acuity. It is also largely a matter of education with these children. Dr. Suker agreed that there are secondary contractions. That being taken away will give another point in clearing up the faulty images formed. High degrees of refractive error, particularly astigmatic, will give oblique images. We all know that in early presbyopes there is a certain amount of astigmatism.

Dr. Faith inquired if the refractive condition of the patient's eyes had been frequently tested?

Dr. Coleman replied that he had examined her repeatedly, but did not prescribe glasses at all.

Dr. O. Tydings observed that the patient was a mouth-breather. Wherever varying degrees of refractive conditions are noted, getting one result to-day and another to-morrow, the visual acuity is very low. The first thing to eliminate in these cases is a serosinusitis. This child's lids are hyperemic and the chances are that the globes are congested. Where any improvement of vision with an alternating current is developed, or any other form of current secures results, it would be dependent entirely on the condition of the sinuses. Dr. Tydings suggested that this feature of the case be inquired into.

Dr. Coleman, in closing, stated that he did not examine into this because the child has been improving without correcting other conditions. He thought that we are too apt in cases of high refractive error to let the patient alone. This patient was prescribed $+ 6$ D., and it was a good prescription, but she could not see one line better than 20/200, and no better with $+ 6$ cylinder than she could without.

Secondary Divergent Strabismus.

Dr. H. W. Woodruff's patient was operated on about twenty years ago for convergent strabismus. Evidently a very extensive tenotomy of the internal rectus was made, because

there were fifty degrees of divergence, with exophthalmos, sinking of the caruncle, and paralysis of the internal rectus, so that adduction was impossible. The eye could be rotated to the medium plane from a position of abduction, but could not be adducted beyond this plane. After subconjunctival anesthesia a vertical incision was made through the conjunctiva over the whole tendon insertion. The conjunctiva was dissected backward as far as the caruncle, disclosing a retracted capsule. The muscle fibers could not be distinguished. By incising the capsule and reuniting the cut ends after bringing them closer together, function of the muscle was restored.

Vertical Strabismus.

Dr. Woodruff: The left eye in this case was turned outward and upward about fifteen degrees in each direction.

O. D. — .50 Sph. \supset 1.75 cyl. ax. $50^{\circ} = 6/10$ —.

O. S. — 2.00 Sph. \supset 2.75 cyl. ax. $160^{\circ} = 6/30$.

The horizontal deviation was corrected by a tucking of the internal rectus. A partial tenotomy of the inferior rectus was done at the external border, but gave no appreciable result. Later a tucking operation was done on the inferior rectus, with complete tenotomy of the superior rectus. This gave the desired cosmetic result, demonstrating that the inferior rectus lends itself to tucking as readily as either of the horizontal methods.

Retinitis Proliferans.

Dr. Woodruff: The patient presented himself with a history of loss of vision in the right eye occurring suddenly a week before. There was a positive history of lues. Vision: Counting fingers at eight inches in the right eye, 20/200 in the left. Ophthalmoscopic examination of the right eye showed a neuroretinitis with some hemorrhages. Patient complained of severe headaches. He was treated with mercurial inunctions and potassium iodide. Vision slowly improved up to ability to count fingers at five feet: in two months there has been no change in vision. There is now also a hyperplastic formation over the disk to the nasal side, which is gradually increasing in size.

Discussion.—Dr. Thomas Faith thought that the results in the strabismus cases were good. There is little bunching after

seven weeks—not more than would be present after any kind of operation.

Dr. Oscar Dodd considered the results good, especially in the case of convergent strabismus. He operated on a case where there was a 30° vertical deviation, which was congenital; almost a complete tenotomy was done. Not getting the lateral fibers of the superior rectus, an advancement on the inferior followed, bringing them down so that they were nearly parallel, but it came back and there is still marked deviation. The inferior rectus was advanced as much as was possible at the time.

In regard to cases after a complete tenotomy, where there is no movement, Dr. Dodd believed that when the muscle is entirely cut off, as this apparently was, and all lateral connections are severed, the fascia which comes up is attached to the wall of the orbit and apparently pulls the muscle away from the eyeball, and there is no deviation. In these cases there is no connection between the severed muscle and the eyeball, so that if one can find it in the action of the muscle there will be a pulling backward of the caruncle and no action on the eyeball. The ability to get a result in these cases depends on whether there has been a large amount of traumatism done at the time of operation, so that the muscle is bound down by a mass of cicatricial tissue. If it is, it is practically impossible to separate it and bring it forward and attach it to the eyeball and get any movement. In some of these cases the speaker had been fortunate enough to separate the muscle, bring it forward and, although the action was weak, the result was fairly good. It is a much more difficult operation than the ordinary advancement.

Dr. Richard J. Tivnen said that the bunching following a tendon tucking disappears surprisingly early. With reference to the difficulty of getting the muscle when it is so far back following a tenotomy for a convergent strabismus, the speaker recalled two patients who were sisters on whom tenotomies had been done by another physician. In one case Dr. Tivnen did the operation Dr. Dodd spoke of, with fairly good result. In the other case he failed to get any result.

Dr. George F. Suker suggested that Dr. Woodruff practically made a new muscle. The muscle attachment to the capsule is disregarded, but the tendon is simply cut hori-

zonally and a new muscle is made. That is a step not described anywhere heretofore. It is a new method of restoration of a muscle.

As to the thickening in these tucking operations, that disappears very rapidly and will do so more rapidly providing, when the operation is completed, the site of the wound is thoroughly covered with conjunctiva, so that no opening is left. That has been the speaker's experience with the operation, which he has been doing for a number of years. There has been considerable thickening, but when the conjunctiva was coated thoroughly there was not so much thickening, and what there was disappeared rapidly.

Dr. D. C. Orcutt recently operated on a patient by this procedure. For some time he has been experimenting with a stitch to keep the muscle from slipping away. He inserts a mattress suture at the sclerocorneal margin and brings it back through the muscle, at the same time fortifying it with a Worth suture. Silk is used. He has obtained perfect results, having made an advancement of 30° in one case.

Dr. Clark Hawley complimented Dr. Woodruff on his tucking operation. Dr. Woodruff performed it for him in his clinic, with a result that was simply perfect. The operated eye was practically a blind eye, but the cosmetic effect was as good as in his own case.

Dr. O. Tydings believed that, as a scientific body, we should insist on exactness in terms. He did not know of anyone who had succeeded in making a new muscle. These muscles are not attached to rubber bands, so that when they are cut they can be picked up and brought back and advanced. While it may not be possible to recognize the muscle fibers in the tissues, they are there just the same, and when the tissues are drawn forward the cut ends of the muscle are practically united. Dr. Tydings had a case where the cosmetic effect was perfect, so far as the eye was concerned.

As to the case of retinitis proliferans, if a patient has had syphilis at some time during life, everything he may have afterward is attributed to the syphilis, and yet it does lay the foundation for many conditions. A most frequent cause of hemorrhage, especially in the retina, is tuberculosis. In syphilis there occurs an obliterative endarteritis, and while this man may have had syphilis, the question of tuberculosis should be eliminated.

Dr. Woodruff (closing): Worth says, in his book on "Squint," that the tendon lies over against the orbit somewhere. The point I wanted to bring out especially is that you can find the muscle; therefore, I simply dissect the conjunctiva back as far as the caruncle and under it, and then take hold of the edge underneath the conjunctiva, which is Tenon's capsule, and probably contains muscle fibers, and make a couple of horizontal slits in it, fashioning a tongue-shaped flap. This is not a new muscle, but simply bringing together the muscle fibers which are not visible. Otherwise the muscle would not have the power of contraction. I have always gone on the theory that you can tenotonize an external rectus muscle with less regard to ultimate results than you can the internal rectus, but there is a limit even to that. There is some danger of overcorrection if the operation is combined with an advancement or a tucking. There is a slight convergence in my case. I started out on the theory that it was impossible to get an overeffect. I did all I could to get an overeffect. I have had few cases of secondary divergence to operate on. I have seen them, but have not been willing to operate, but now I shall not hesitate to do so, because I feel that I can promise the patient a satisfactory result.

Fuerstenau's Roentgenstereometry.

Dr. Max Reichmann: The method is based on certain geometrical calculations which show that the vertical distance of an object examined from the fluorescent screen or the sensitive plate depends entirely on the distance of the two shadows which are obtained when two bundles of Roentgen rays reach the object at the same time, and from the same distance, provided the distance of the tube from the plate is constant, as the distance between the two anticathodes also must not vary, the same being always $6\frac{1}{2}$ centimeters.

Foreign Body in the Eye.

Dr. Thomas Faith exhibited a patient in whom all that could be seen at first observation was a corneal wound, a small healed wound in the iris, and a slightly opaque lens. Dr. Reichmann located the foreign body. The magnet was placed over the center of the cornea, and a piece of metal immediately bobbed up. It was just behind the iris, where Dr. Reichmann

had located it. Dr. Faith extracted it, but in doing so pulled the iris loose.

Discussion.—Dr. Fisher congratulated Dr. Faith on the result obtained in this case. If the incision had been made below instead of above, the iris would have been pulled out just the same.

We are, of course, always glad to have the assistance of a Roentgen expert in this work, but Dr. Fisher wants him to tell him the location of the foreign body without having to look at the plate himself. The speaker has found that the patient may lose his eye. If the operator in making the plate will watch the good eye, he can tell whether the eye is moving or not. If the patient moves the eye, the piece of steel is apt to be missed.

Dr. Coleman: It is very important to localize a foreign body in the eye. Unless Dr. Fisher has changed his views, he operates first, and then gets a skiagraph after the operation to see whether he has removed the foreign body. I prefer to have the picture first, so that I can tell just where to put my magnet. I like to get as close to the foreign body as possible because the traction of the magnet is inversely to the square of the distance. I do not want to draw the foreign body clear across the eye. Dr. Faith in his case followed Haab's rule of withdrawing the foreign body through the front. I have devised three or four different tips which I can attach to the large tip, and, if necessary, insert through the scleral wound. I cannot see the advantage of drawing this through the front at the great risk of wounding the iris and the lens, particularly if the foreign body has not caused a cataract in entering. If the body has entered at the posterior sclerocorneal margin, Cobb reverses the polarity of the magnet and shoves the foreign body back, but I think that a pure coincidence. If you will take a small irregular particle of iron or steel, approach it with a hand magnet, and reverse it rapidly, either end will attract equally well.

Dr. Fisher: I do not take out a piece of steel through the sclera and I do not go behind the iris. I always pull the steel out through the pupil when the lens is injured. I do not have a skiagraph made when the lens is injured, because I want to remove the steel as soon as possible. If the lens is injured, it is just as well to take the steel out through the pupil, as any

place: in fact, a little better, and the skiagraph would not help you at all.

Dr. H. W. Woodruff: Haab, in a paper read before the American Medical Association in 1902, laid stress on placing the tip of the magnet over the center of the cornea, and have the piece of steel pass between the lens and the ciliary body, drawing it through the pupil into the anterior chamber. In a recent article he expresses regret that his remarks were not adopted by American ophthalmologists, and that the trend of opinion in this country seems to be that the foreign body should be extracted through an incision in the sclera. If a foreign body but recently entered the eye through the cornea and passed into the vitreous, withdraw it through that opening. In a recent case I saw the patient half an hour after the injury, and shortly afterward I succeeded in extracting the piece of steel through the point of entrance. The interesting point in the case was that the lens did not become opaque. The patient has 20/20 vision. There is still the line in the lens through which the foreign body passed, but the remainder of the lens is clear.

Dr. Max Reichmann: You can extract a piece of steel with a magnet without an X-ray picture if the steel is in the eye, but if it is in the orbit you cannot extract it. To determine the location of the foreign body you must have a skiagraph. Formerly, I took two pictures to localize a foreign body. Now I take only one. The Sweet method is a good one, but very complicated. The stereoscopic method is excellent. It shows the location of the foreign body exactly, but it is difficult to make these stereoscopic plates. Another method is to make two pictures at right angles to each other. The objection to this method is that the patient does not keep his eye perfectly quiet. Fuerstenau's method is simple and exact. I cannot watch the good eye to see whether it is moving or not because I am not anywhere near the eye while the tube is in action. I remain in a lead-lined cabinet.

Dr. Faith expressed surprise at what Dr. Coleman said about drawing the foreign body into the anterior chamber. He has seen it occur many times in rabbits' as well as in patients' eyes. He did not think it difficult to do this. Perhaps in this case, if he had extracted the foreign body by means of a probe, he might not have drawn out the iris. Dr.

Faith has had cases in which the result was better than in this one, but Dr. Reichmann certainly helped him to find the foreign body in this eye. He followed Haab's instruction of placing the tip of the magnet in the center of the cornea, but this is the first time that he had a foreign body entangled under the iris, which would not loosen. It looked more like a nail than a small piece of metal, a millimeter or two in diameter.

WILLIS O. NANCE, *Secretary*.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Meeting of October 21, 1911, in Denver. Dr. D. H. Coover presiding.

Symmetrical Corneal Opacities of Unusual Type.

Dr. G. F. Libby presented a woman of thirty-seven, with symmetrical opacities about 5 mm. in diameter just below and to the nasal side of each pupil. Their color was whitish, with a faint yellowish tinge, and a few fine vessels penetrated each opacity. The corneal epithelium was smooth and not elevated. The proper substance of the cornea was deeply invaded. The opacity of the right eye was of one and a half years' duration; that of the left, one year. In the five months the case had been under Dr. Libby's observation there had been no change in the opacities; although the patient had been treated for intestinal autointoxication, 15 grains of potassium iodide had been administered t. i. d. and yellow oxide of mercury ointment and massage had been applied to the opacities, for three months. The Wassermann reaction was negative. The tuberculin test was contemplated. The family history revealed no ocular defects, and the patient gave a history of continued good health. With the correction for 1.75 D. of mixed astigmatism, R. V. = 5/6, L. V. = 5/5, with normal accommodation. Viewed through the corneal microscope the right opacity presented the appearance of a mass of closely packed chloesterin crystals, which was the case in only the nasal fourth of the left opacity. A slight translucency in the central portion (one-half) of the opaque area in the left cornea was doubtless due to the fact that crystalization of the infiltrate had not yet occurred in that location. The temporal fourth of this opacity was more opaque than the central zone, but it showed no crystals.

Discussion.—Dr. Jackson said the patches resembled lesions produced by some organism and they had the appearance of a colony on a culture plate. Although he did not think that it was an independent infection, he was of the opinion that there was a strong constitutional element in it. Such opacities

generally appeared in earlier life and usually in the center of the cornea instead of near the edge as in this case. He felt that they were closely allied to hereditary or family opacities and considered the case a very rare one and one of great importance.

Dr. Neeper thought that it was an exudate thrown out by an interstitial invasion and that the symmetry was a coincidence. Because of the blood supply he did not think there would be much change, otherwise the deposits would become more flakey and tend towards calcareous degeneration. He had seen two cases of a somewhat similar appearance in which the deposits decreased in size.

Dr. Walker thought that they were of central origin. Some trophic change causing impaired nutrition.

Dr. Bane thought the presence of the cholesterol deposits was apparent to the naked eye as shown by the peculiar glistening appearance of the spots.

Dr. Strickler felt that in view of the two spots being symmetrical they must be due to a trophic change.

Dr. Magruder suggested a microscopic examination if such be possible

Dr. Pattee thought that they were the results of a dyscrasia.

Dr. Sisson suggested a tubercular origin. He had seen a case in which there were large sized deposits of a yellowish color in the substance of the cornea although not symmetrical in outline. It was a well known fact that patients suffering from tubercular eye lesions did not as a rule present marked constitutional symptoms.

Dr. Hosmer thought that if they were the result of a nutritional change stimulative treatment in the form of dionin would certainly be indicated.

Dr. Conant was of the opinion that if the spots were the result of a trophic change we would not have the leash of vessels present as in this case.

Dr. Sedwick thought that there were trophic changes and suggested stimulative treatment, such as intermittent X-rays.

Dr. Coover had a case under observation in which there were deposits in the cornea of a similar appearance except that they were deeper and had no blood vessels running to them. They developed in the clear cornea following a general haziness and were symmetrical in outline. The Wassermann

test was negative and while the patient gave no tubercular history—the tuberculin test was positive and tuberculin treatment was resorted to.

Sarcoma of the Chorioid.

Dr. W. A. Sedwick presented a woman 45 years of age suffering from an intraocular growth of the right eye. The patient gave the following history: Father died of cancer of the stomach. General health not very good. Complains of stomach trouble, pain after eating and following any exertion. One and one-half years ago she noticed that she could see only one-half of an object with the right eye. About two months ago the eye began to pain, the pain being intermittent in character. Examination showed a small red area at the inner margin of the limbus running to the inner canthus, and down to the lower fornix. Vision reduced to perception of moving objects. O. S. 6/6. No increase of tension. Ophthalmoscopic examination revealed a mass situated just back of the iris on the nasal side. The anterior and lower portion was dark, while above and posterior it was lighter in color. Transillumination showed that the growth involved part of the ciliary body extending backward possibly 10 mm.

Discussion.—Dr. Jackson thought the case presented some peculiarities in appearance that would suggest a cysticercus. He could see no chorioidal or tumor vessels, but owing to the rarity of the cysticercus in this location he was inclined to the belief that this was a sarcoma.

Dr. Coover was impressed by the same points as Dr. Jackson, and also noticed that one could get a reflex through a portion of the mass which was characteristic of cysticercus.

Large Floating Opacity in the Vitreous.

Dr. Sedwick also presented a boy 15 years of age with marked loss of vision in the left eye. The family and personal history were negative except that five years ago a powder explosion burned the lashes of the left eyelid, but so far as he was aware there was no injury to the eye. At present he has asthenopic symptoms with stomach trouble which caused him to seek the services of an oculist. The vision of the right eye is 15/15.

When the eye is turned inward a floating body appears from

behind the outer margin of the iris, and swings over the field extending almost entirely across the dilated pupil. It appears to be almost 2 mm. in width.

Discussion.—Dr. Bane was of the opinion that the traumatism must have been greater than the patient supposed. He thought the retina appeared hazy, and elevated. He thought there was a degeneration of the blood vessels farther back.

Dr. Neeper observed scar tissue to the nasal side of the fundus.

Double Hemorrhagic Papilledema.

Dr. Black presented a man aged 30. First seen July 31, 1911. At this time he was complaining of severe headache and not seeing well. Examination revealed a double hemorrhagic papilledema with 5 D. swelling of the right disk and 7 D. of the left disk. After examination by a neurologist the condition was regarded as a pachymeningitis luetica basas, with localized areas of hyperphasia. He was placed upon mercurial inunctions of one drachm of mercurial ointment twice daily. In a few days' time his headaches disappeared and gradual improvement in vision took place. In thirty days' time the hemorrhages had disappeared from the edematous nerve heads and the swelling of each disk subsided 2 D. At this time the swelling presented an unusual appearance. With the subsidence of the edema it was noted that congenital opaque nerve fibers in each eye had modified the appearance of the edema. At the present time the edema has disappeared and the congenital opaque nerve fibers can be readily seen. The question that presents itself is whether the condition is congenital or whether it is the result of a degenerative process incident to the edema from the choked disk. Vision at present is normal and all evidences of brain disturbance have disappeared under the use of mercury. The improvement was so rapid and satisfactory that one is led to question whether salvarsan could have acted more rapidly.

Discussion.—Drs. Jackson, Coover and Sedwick are of the opinion that the opaque nerve fibers were congenital and not the result of the edema.

Glaucoma.

Dr. Coover presented a young man of twenty suffering from increased tension in the right eye with total loss of vision, and a retinitis proliferans in the left eye. He gave the fol-

lowing history: July 4, 1911, the vision of the right eye became hazy and remained so about two hours. The following day the haziness reappeared and remained all day. The eye was inflamed but not painful. From this time on the vision was blurred and continued to grow worse. On September 29th he had his first attack of pain, following which the inflammation cleared up. On October 2nd, had a second attack of pain which has continued at intervals until the present time. The attacks of pain have been accompanied by vomiting. The tension reached as high as $+3$, the cornea anesthetic and the pupil dilated. No fundus reflex. One peculiar feature of the case is that the patient obtains some relief from the pain by placing his head in various positions, at times practically standing on his head, which position he will maintain for hours. He has responded to no line of treatment. At times a discharge from the nose has been observed.

Discussion.—Dr. Sisson said that considering the patient claimed to get relief by placing his head in various positions, such would suggest the possibility of sinus trouble, the position favoring drainage. At the suggestion of Dr. Coover he had thoroughly examined the nose but failed to find any evidences of sinus involvement. But as is often the case sinus trouble can exist when the nasal examination is negative, therefore he could not feel like definitely excluding it.

Double Optic Atrophy.

Dr. H. R. Stilwill presented a case of double optic atrophy of specific origin in a man forty-one years of age. His vision had been failing for the past five years. First seen May 26, 1911, when O. D. = $4/6$, O. S. = $4/30$ +. At present O. D. = $4/20$, O. S. = $4/60$. No symptoms of tabes. He has been taking large doses of K. I. and strychnia since first seen. Wassermann positive. Dr. Stilwill presented this patient in the hope of eliciting the opinion of the various members present concerning the use of salvarsan in such cases as he intended giving it.

Discussion.—Dr. Coover had used salvarsan in several such cases with marked improvement. He thought this was a suitable case for its use.

Dr. Sedwick had seen a case of diplopia and optic neuritis

of specific origin treated with salvarsan in which the diplopia disappeared entirely and the vision improved markedly. He would give it in this case.

Foreign Body in the Lens.

Dr. Edward Jackson showed a case in which a fragment of steel had been driven into the lens. It was situated in the anterior and central portion where it was plainly visible to the naked eye. Opacity of the lens substance had immediately followed. At the present time the fragment was being well tolerated, there being no marked inflammation of the surrounding tissues. Extraction of the lens including the foreign body would be made.

Congenital Cataract, Epithelioma and Peculiar Colored Pigment Deposit in the Chorioid.

Dr. Walker showed two cases of congenital cataract, one in a young boy where no operation had been performed, the other in an adult who had 6/6 vision following operation. A man fifty-three years of age in which he had twice removed a small growth from the right eye. It was situated at the sclero-corneal junction on the temporal side, and at the time of removal resembled a pterygium. Pathologist reported it to be an epithelioma. At the present time there were some small nodules beginning to appear at the site of removal. A young man twenty years of age who was recovering from an attack of keratitis, iritis and vitreous opacities. Examination with the ophthalmoscope revealed the presence of a bluish white deposit just below and to the outer side of the disk. It was over two disk diameters in size, and there was no evidence of any inflammatory changes around it. It appeared to be composed of pigment granules of a bluish tint rather than black. The patient gave a history of a divergent squint since childhood.

Discussion.—Dr. Chase would use the X-ray in the case of epithelioma.

Dr. Coover would also use the X-ray but thought the case a good one for the use of radium.

Dr. Neeper thought the pigment deposit congenital.

ELLET O. Sisson, *Secretary.*

OPHTHALMIC SECTION

ST. LOUIS MEDICAL SOCIETY.

Meeting, October 4, 1911.

The Broad Keratome in the Removal of a Dislocated Lens.

Dr. Arthur E. Ewing referred to a patient, 44 years of age, who had been under observation for ectopic lentis in each eye, for a period of 26 years, the lens in the right eye being dislocated up and out, and in the left eye almost directly upwards, and in each eye the lens occupied about half of the pupillary area. Through the aphakic portion of the pupils, the corrected vision of the right eye was 20/120 and of the left eye 20/38. Eight months ago, after a fall, an examination showed that the right lens had been loosened above and was found lying in the lower anterior portion of the vitreous, and would float upward with a sudden movement of the globe. After the lapse of three months there developed brief attacks of blurred vision in the right eye. On the morning of September 22nd, the patient was awakened by severe pain in the right eye, and vision was reduced to the perception of large objects. Six hours later when seen by Dr. Ewing, the lens was half way through the pupil and firmly wedged in the outer portion of the anterior chamber, the globe was hard and somewhat injected, and the vision was reduced to hand movements at two feet. After the use of pilocarpin the removal of the lens was effected by making a corneal incision to the temporal side in the sclerocorneal margin, with a broad lance shaped keratome, the point a rectangle, and passing the blade back of the lens so as to fix the lens between the blade and the cornea. The fixation forceps being then exchanged for a Daviel spoon, pressure was made with this backward on the nasal portion of the cornea, as the knife was slowly withdrawn, thus forcing the lens to follow through the wound on the anterior surface of the knife. When sufficient room was given in the wound by the receding blade the lens came away readily and the final slow exit of the knife was followed by a moderate gush of

aqueous and fluid vitreous. Considerable pain accompanied the escape of the aqueous, suggestive of a deep hemorrhage. This persisted for half an hour before it ceased sufficiently to justify the adjustment of the final dressing. The subsequent course was uneventful, the final vision being 20/120. When a keratome is used for the removal of the lens from the anterior chamber, Dr. Ewing stated that the blade should be not less than 12.5 mm. in width, from one lateral angle to the other.

Copioopia Hysterica; Report of Two Cases.

Dr. Wm. S. Shahan stated that copioopia hysterica is a term introduced by Förster, many years ago, to indicate a condition in which most of the symptoms of the accommodative asthenopia of hypermetropes were present, either in the total absence of such asthenopia or in the presence of its complete correction. The condition so strongly simulates asthenopia that it is likely to be described, in such works as mention it at all, under the heading of "Anomalies of Accommodation." The patient's symptoms of headache, pain about the eyes and in the globes, "as if the eyeballs would burst," of ability to read only a short time without distress, and of photophobia, cause her to attribute all her trouble to eye conditions. Nevertheless, the pathogenesis of the disease appears to have no ocular basis whatever, and to be dependent upon a long standing disease of the uterus and its adnexa, with reflex irritation of the fifth and optic nerves.

CASE 1.—Female, age 34 years, who gave a history of pain in her sides since the birth of her third child seven years previously, and an operation for the removal of the appendix and the left ovary fourteen months previously. She complained of photophobia, headache and ability to read only a few lines at a time without discomfort, and stated that she had always been near-sighted. She had a moderate myopia associated with a high myopic astigmatism, and practically no change could be made in her correction. The conjunctivæ were normal, the pupils rather large, the fundus of each eye normal except for a slight stretching of the chorioid about the disk. The fields were somewhat contracted. While the first attack subsided under the instillation of biborate of sodium, the subsequent attacks, which were worse at the time of menstruation, failed to respond to various medicinal, refractive and psychic

expedients. Rigid control and supervision of gynecological conditions were not possible in this case, and when last heard from her condition was not satisfactory.

CASE 2.—Female, age 21 years. There was a history of a curettement soon after her marriage and for several years she had pain and tenderness in her left side. She complained of pain in the head, "behind the eyes, and in the eyeballs," inability to read without getting headache and eyeache, and photophobia. Aside from a hyperopia of two diopters her ocular condition was normal. The attacks of severe pain were accompanied by nausea and vomiting. A gynecologist reported an "infiltration of the left parametrium and about the left adnexa and some endocervixitis." In this case the pupils were also larger than normal and pilocarpin appeared to be of real value as it was in the other case, probably by shutting out some of the excessive light. Holocaine was also of value during the height of an attack. After prolonged nonoperative gynecologic treatment she improved in every way. Dr. Shahan stated that the photophobia in these cases was most marked in artificial light, which seemed to indicate a hypersensitivity to long light waves.

J. G. CALHOUN, *Section Editor.*

BOOK REVIEWS.

Text Book of Ophthalmology.

By DR. ERNEST FUCHS of Vienna. Fourth American edition, translated from the twelfth German edition, by ALEXANDER DUANE, M. D., of New York. Published by the J. B. Lippincott Company, Philadelphia and London. 1911. Price, \$6.00.

In introducing Professor Fuchs as the guest of the American Ophthalmological Society in session at New London, Conn., last summer, the President of the Society remarked that Fuchs years ago discovered that he could write a text book, and that since that time a great many others have discovered that they also could write text books on ophthalmology. It is indeed true that with the help of Fuchs, many a good text book on ophthalmology has been written, which is the surest indication and measure of the standard.

The present edition of almost one thousand pages contains an entirely new part entitled *Introduction*, which comprises general physiology of the eye, general pathology, and general therapeutics. The usefulness and helpfulness of this section in introducing and collaborating the portions which follow and which relate to the diagnosis, pathology and treatment of special ocular conditions will appeal at once to the student of ophthalmology and the general practitioner. Following this introduction are the chapters on objective examination and functional testing of the eyes. These two chapters are well known and could not well be improved upon. A systematic treatise on diseases of the eye is then continued through 669 pages. Of special importance and of preeminent worth are the chapters on *Diseases of the Cornea* and *Disturbance of Motility*. These subjects are both treated in a most comprehensive and authoritative manner, and a careful study of them will more than repay the reader.

Throughout the book the anatomy of each tissue is placed at the commencement of the chapter dealing with the diseases of that tissue. This arrangement we think is not so good as

that giving a consecutive consideration of the anatomy of the eye, but as there are good arguments on both sides, the question is not one of very great importance.

We must again call attention to the continuance of confusion in the use of the terms *nyctalopia* and *hemeralopia*. "Night blindness" and "day blindness" are terms which convey an invariable meaning at all times and in all places, and would for this reason seem preferable.

Dr. Duane has performed his part of the work with the greatest care and exactness. Wherever necessary or advisable he has, as in previous editions, added his own notes so as to incorporate the views and practices of American ophthalmologists, but without in any way disturbing the text of the author.

The book is well and sufficiently illustrated, and mechanically presents the high standard of excellence for which the publishers are noted.

WILLIAM T. SHOEMAKER.

The Ophthalmic Year Book—1911.

Edited by EDWARD JACKSON, M. D.; THEODORE B. SCHNEIDERMAN, M. D., and WILLIAM ZENTMAYER, M. D. Published by the Herrick Book and Stationery Company, Denver, Colo. Price, \$5.00.

Volume VIII of the Year Book appears with distinct improvements over previous volumes. It contains more pages and is said to review 30 per cent more papers than last year's volume, and 35 per cent more than the *Index Medicus* covering the same period. The names of authors mentioned or quoted are printed in bold face type, making it much easier for the reader to pick out the statements of any particular writer.

Use of the Year Book is still further facilitated by including in the list of journal articles the page number of the article referred to.

The price has been increased, but not in excess of the value received, and the editors very frankly suggest that if the Year Book is to be continued as an established publication on a permanent basis, there must be an increased number of subscribers willing to pay the price. Comparatively few ophthalmologists realize or even have the slightest conception of the energy, effort and skill required to produce a work of this kind, to say nothing of the cost of production, and few appre-

ciate the value of such a work when completed. Many fail to appreciate because they are unacquainted with the Year Book, or if passingly familiar with it, do not know how to use it. It is not a text book, and can in no way take the place of one. It is a bureau of information and will place one directly in touch with the ophthalmic literature of the world for the year of issue. To secure such a result without the Year Book would be a laborious and time-consuming task, and yet the demand for this service would seem to be out of proportion to the value. It is safe to say that the editors will never make money on the Year Book, but it seems far from right that they should lose money in such a useful and important enterprise.

Through eight years the Ophthalmic Year Book has steadily grown and improved and there can be no thought now of anything but continued growth and improvement. It has the unqualified endorsement of all ophthalmologists who are properly familiar with it, and deserves immediate introduction to the shelves of all ophthalmologists who are yet to learn its value.

WILLIAM T. SHOEMAKER.

Physicians' Visiting List—1912.

Published by P. Blakiston's Son and Company, Philadelphia.

This useful little publication has been continued by the publishers for sixty-one years and would seem to have won for itself a permanent place in the inside pocket of the busy practitioner. Several forms are available, designed for the recording of from twenty-five to one hundred patients weekly. In addition to these are a perpetual edition and a monthly edition. Price varies from \$1.25 to \$2.50, according to the style desired.

The contents include a table for calculating the period of utero gestation, a table of incompatibility, chemic, pharmaceutical and therapeutic; a table of poisoning and its immediate treatment; the metric system of weights and measures; a table for converting apothecaries' weights and measures into grams; a very complete table of doses, given in both systems; the quarantine period for infectious diseases; the treatment of asphyxia and apnea; and finally, a comparison of thermometer records, giving at once the equivalents in the Fahrenheit, Centegrade and Reaumer scales.

The body of the book is devoted to the listing of patients, with pages for special memoranda, addresses of patients, bills and accounts asked for, vaccination engagements, obstetric engagements, births, deaths, and cash account. The Visiting List is well recommended for the practitioner who feels the need of a book of immediate entry, and who also needs immediate information concerning facts which have been at times known, but which are for the time being forgotten.

WILLIAM T. SHOEMAKER.

NEWS AND NOTES.

Dr. William T. Shoemaker has resigned as editor of the ANNALS, and takes this opportunity of thanking his associates on the staff for their untiring and efficient efforts in the interests of ophthalmic journalism.

Doctors Myer Wiener and Clarence Loeb of St. Louis are the newly appointed editors.

The ANNALS is fortunate in securing the services of two such active and capable men to direct this most important work, and the continued success of the journal under their direction is assured.

Dr. Mary Buchanan has been appointed Clinical Professor of Ophthalmology in the Woman's Medical College of Pennsylvania. The duties of this position have been performed by Dr. Buchanan for several years without adequate title.

Dr. William Zentmayer, who for some time has been Extra-mural Professor of Ophthalmology in the Philadelphia Polyclinic, has scaled the wall and is now Professor of Ophthalmology in the same institution.

The members of the Colorado Ophthalmological Society tendered a complimentary dinner to Dr. Edward Jackson at the University Club, Denver, on the evening of October 21st, 1911.

Dr. Burton Chance has been appointed ophthalmologist to the Pennsylvania Railroad, succeeding Dr. A. G. Thomson, resigned.

THE ANNALS OF OPHTHALMOLOGY

Vol. XXI

APRIL, 1912

No. 2

IX.

THE ORIGIN OF THE MELANOTIC PIGMENT IN THE EYE OF VERTEBRATE EMBRYOS, AND IN SARCOMA OF THE CHOROID.*

AUREL V. SZILY, M. D.,

FREIBURG I. BR.

I. INTRODUCTION.

The dark pigment, the so-called melanin, enjoys a wide distribution in the animal kingdom. The dark coloring matter of the skin and its appendages in the vertebrates and invertebrates, the colored contents of the usual pigment cells of the connective tissue, the chromatophores, the pigment epithelium of the retina, melanotic tumors, etc., all belong to this group.

Our knowledge concerning the genesis of this coloring matter is, however, very slight.

So far, the chemical analysis of the natural coloring matter, which has been undertaken by many, has led to no satisfactory solution of the question of its origin. Although formerly no one doubted that the dark pigment of the skin

*Translated from the *Archiv fuer mikroskopische Anatomie*, 1911, Vol. LXXVII, p. 87, by Clarence Loeb, A. M., M. D.

and its appendages was derived from hemoglobin, a different opinion is held today. It is no longer regarded as a simple reduction product of hemoglobin, but rather as a result of a local, complicated metabolic process taking place in the respective pigment cells themselves.

The reasons upon which is based the belief in the autochthonous origin of the pigment in the cell as opposed to its derivation from the hemoglobin, are of two kinds. The first is a negative one, and consists in the fact that the so-called melanin contains no iron, which the hemoglobin does. But this reason is not a convincing one. I need mention only that M. B. Schmidt^{104 106} and E. Neumann⁸² were able to demonstrate hematogenous pigment lacking iron. Therefore lack of iron cannot be used as an argument on either side in settling the question, for melanin might be a stage of blood pigment later than that showing a hemosiderin reaction (Schmidt).

A much more important proof of the possible independent origin of the melanin is the positive one given by the formation of products similar to melanin from ordinary albumin, so that all known animal coloring matter might be derived from a chromogenous group of albumin molecules, as a mother substance. But this proof, too, is not perfect, and the skeptic might justly demand a proof of the chemical identity of the artificial and natural melanins.

Such a proof, however, is very difficult to provide, because no two of the pathologic and natural melanins have heretofore had the same composition.

The great importance of the ferments in the chemistry of the cells has caused some investigators to believe that fermentative changes play a role in the formation of the multi-form natural colors. Bertrand¹¹ found that certain plants possess an oxydizing ferment (tyrosinase) which oxydizes tyrosin, with the formation of brown colored substances. Since then it has been demonstrated that tyrosinase is present in the fluids and organic extracts of numerous plants and animals. The conversion of tyrosin into artificial melanin under the influence of tyrosinase takes place with the evolution of hydrogen and taking up of oxygen, without any appreciable change in the relation between nitrogen and carbon.

The organic extract obtained by C. Neuberg⁸³ from a mel-

notic adrenal tumor had no effect upon tyrosin, but acted on adrenalin and p-oxyphenylethylamin with the formation of coloring matter. This fact attains great importance by virtue of the statement of Halle, that p-oxyphenylethylamin is an intermediate stage in the formation of adrenalin from tyrosin.

According to Jaeger,²⁰ the production of melanin in melanosarcomatosis is chemically characterized as an oxydative transformation of suprarenin, which takes place in the cytoplasm under the influence of a specific cell ferment. The chemical production of the coloring matter, according to this author, takes place by means of enzymic action, the cell producing it by means of its specific powers; it is an autochthonous metabolic pigment formation.

O. v. Fürth²¹, who has made many worthy investigations upon the synthesis of animal coloring matter, divides the physiologic and pathologic formations of melanin into two phases, on the basis of previous investigations:

(1) The splitting off of cyclic complexes from the albumin molecule, which involves the probability of the action of autolytic ferments, and

(2) The transformation of these cyclic complexes into melanin by the action of an oxydizing ferment.

It seemed to v. Fürth not improbable that this process was complicated by

3. The involvement in the condensation process of accessory groups (containing sulphur and iron complexes and possibly also aliphatic chains).

This theory of v. Fürth, which well shows the prevailing opinion of the physiologic chemist as to the character and genesis of melanin, has of course only the value of a well chosen working hypothesis. Its correctness must be shown by further investigations.

Very recently H. Eppinger²⁰ was able to give an exact demonstration of the derivation of melanin from tryptophan. In a pathologic case of melanin formation, he was able to isolate an intermediate body which was easily transformed by condensation and simultaneous oxydation into a coloring matter, just as anilin is converted into anilin black. It is still to be proven that the substance described by v. Eppinger will explain all cases of normal pigment formation.

But even with a correct answer to this important question,

we must be careful in correlating the results of laboratory experiments and processes which take place in living organisms. The attempt to do this is unfortunately prevalent, and the physiologic chemist, trusting in unequally exact methods, is all too ready to graft the chemistry of the laboratory upon living animals and plants. On the other hand, the morphologist looks with recognition and trust towards the beautiful results of the biochemist, who by means of experiments *in vitro* teaches him the derivations and synthesis of all substances found in the organism. Nor is there lacking the statement from noted morphologists, "Physical and chemical standpoints are to be devised and preferred to the morphologic" (Albrecht in *Zellular-Pathologie*³).

Still we would certainly be mistaken if we concluded from these words of Eugene Albrecht that in the solving of biologic questions, morphologic facts must yield to physico-chemical experiments. Such a principle has no standing in processes taking place in the cell.

Here morphologic and chemical changes go hand in hand, and it is the task of the biologist to recognize both of these processes and to judge properly the meaning of each. That now one and now the other phase comes to the front, according to the character of the investigator's work, is easily understood. Here, therefore, as in all scientific borderlands, the balance must be drawn by the scientist, in order to orientate the specialist upon the actual value of his scientific treasures.

At the present time the chemical theory is in the ascendancy in the pigment question, on account of numerous important discoveries, and we frequently hear the statement that there is no use to attempt to solve the problem of the genesis of the melanin except by purely chemical methods.

It is, therefore, probably, timely to review the points in favor of the neglected morphologic standpoint as opposed to this false assumption and to give them firm support.

The morphologic investigation of the pigment genesis, in my opinion, presents of itself a question which may be divided into two points:

(1) Have these melanin granules isolated by the chemists, a heterogeneous, albuminoid basis?

(2) If so, from what part of the cell or which cell group is it derived?

As the forerunner of the belief that organized living parts are present in the granules of the true pigment cells is to be mentioned Altmann himself, the founder of the "Granular Theory." But Reinke⁹⁷ was the first to furnish convincing proof that, at least in the cases of pigmentation which he examined, it was not a mere precipitation of granular coloring matter, but that they were true granula, that is, minute bodies carrying the coloring matter. As is well known, he showed in the pigment cells of the salamander larva that the coloring bodies could be destroyed by oxydation, leaving behind uncolored granula which could be stained by safranin.

According to Galeotti²⁵ there are present in the epithelium of the embryos of crabs and frogs granules stained by fuchsin which later change into true pigment. The form and arrangement of these granules, according to Galeotti, are such as to leave no doubt that they are an early stage of the pigment.

Alfred Fischel²¹ had similar findings in regard to the evolution of the pigment. He found that within the cells which later became pigment cells there developed in increasing numbers little granules which in the beginning are clear and which not till later acquire a dark color. Fischel regards these clear granules as pigment bodies which are changed into pigment by a specific modification or by acquiring a coloring matter.

According to Leydig, Reinke, etc., the eyes of albinotic animals have in the retinal epithelium, instead of colored granules, uncolored ones of the same kind.

Therefore it seems undoubtedly true that certain pigment cells, and especially the typical chromatophores, possess granula in which the formation of coloring matter takes place, and which therefore may be called primitive uncolored pigment carriers.

To what extent the bodies are active in forming the coloring matter is still undetermined.

The second important question which demands a morphologic explanation is: from what part of the cell, or what cell group, are these stromata derived?

Most of the authors who have tried to bring the pigment question into agreement with the "Bioblastic Theory" of Altmann believe that the stromata arise in the cytoplasm independent of the nucleus. Although the most varied changes were noted in the staining reaction, and the form and number

of the nucleoli of the nucleus, the proof of a direct participation of the nucleus in the formation of the primitive granula, has never been obtained. In addition to the above mentioned work of Galeotti²³ there are the negative results of M. Heidenhain.⁴¹

Very little attention, therefore, has been paid to the attempt to prove a relation between the nucleus and the pigment formation. But we must pay special attention to this very question, because it is connected with the important but little understood general biologic problem of the metabolic relation between protoplasm and nucleus, which will be discussed at greater length a little later.

Among the older observers, who argued for a participation of the nucleus in the formation of the pigment, Mertsching⁷² is probably the first to be mentioned. He based his belief on findings on cross sections of hairs and on melanosarcoma cells, where he found the pigment appeared first in the so-called nuclear membrane. In Mertsching's work is first found plainly expressed the theory which we meet frequently later, that the formation of pigment in connective tissue as well as epidermis has a relation to the degeneration of the cell, especially the nucleus.

Additional statements concerning pigment inclusion in the nucleus of different animals have been made by Steinhaus, Leydig, Maurer, Ajello, Rosenstad, etc. Great care is necessary in valuing these statements, because it is very difficult to decide whether in each case it was a true intranuclear depositing of pigment granules, on account of the well known tendency of the pigment to be deposited on the nuclear membrane. During his investigation upon *Helix Nemoralis* L., and *Hortensis* Müller, Distaso¹⁷ had the opportunity to see a direct disintegration of the nucleus into pigment.

Among the dermatologists, Jarish,⁵⁶ basing his statement upon observations upon the tail of a 15-20 mm. triton larva, claimed that the pigment was derived from the nuclear substance, but gave no real proof of the correctness of his statement.

Lukjanow⁶⁸ was the first to claim that the pigmentation of a melanosarcoma was due to a partial or complete death of the nucleus, whereby the freed plasmosomes changed to pigment.

In addition to the technical difficulties of obtaining a dis-

ting, perfect proof of the passage of portions of the nucleus into the cytoplasm, a large number of investigators present other not less important theoretic objections to such a possibility.

I will mention only the widespread belief, whose most important advocate until recently has been Heidenhain,⁴¹ that the nucleus has no part in functions of the cell protoplasm. It forms, so to speak, the resting point within the functioning protoplasm. The task of the nucleus, according to this theory, is confined to the production of new, living parts. So that except possibly in the case of secreting glandular cells, the nucleus alone is the part which gives to the cell its specific quality and practical value.

The interesting experiments of M. Nussbaum⁸⁵ and A. Gruber³³ may be mentioned as especially important and instructive proofs of the function of the nucleus. They gave an unimpeachable proof that nonnucleated portions of infusoria invariably degenerate. A. Gruber concludes from his experiments on Actinophrys that the nucleus has no influence on those functions of the cell which are not directly concerned with reproduction, i. e., movement (pseudopodia formations), alimentation, excretion (pulsation of the contractile vacuole) and growth. Likewise, it has no influence on the external appearance.

A supplement to these investigations has been made by Verworn.¹¹¹ He removed the nucleus from *Thalassicola*, a radiolate of especially large size, and found that it invariably died without the slightest tendency to regeneration in spite of careful protection from any injury.

From similar experiments, whose number can be multiplied at will from recent literature, it is very evident that neither the nucleus nor the protoplasm alone plays the chief role in the life of the cell, but both are equally concerned in the production of the vital manifestations (Verworn). Rabl took a similar stand in his Introductory Address at the University of Leipzig (1906), in which he opposed the theories of Weismann and O. Hertwig, that the chromatic substance was the only carrier of the "hereditary substance." He considered all of the cellular parts to be necessary equally for inheritance, the repetition of developmental processes, as whose end results the characteristics of the parents reappear

in the offspring. Considering the most important investigations, he came to the conclusion that the qualities of the divisions of the nucleus remain unchanged only with equally qualitative division of the protoplasm, while an unequal division of the protoplasm results in qualitative changes in the nucleus.

According to Rabl⁹⁵ the nucleus and protoplasm have the most direct metabolic relations with each other, and it is of a material or substantial kind. The protoplasm undoubtedly takes up substances from its surroundings and in part gives them up to the nucleus, and in part changes them itself. But—and this is a distinct advance over Heidenhain's idea—it also receives substances from the nucleus which it joins to certain substances in the protoplasm, and from this combination are formed new substances with new properties.

But it must be distinctly understood that this view of Rabl concerning the passing of matter from the nucleus into the cytoplasm is based on the changed appearance of the nucleus which is found in gland cells during the process of active secretion. It does not mean that there is any morphologically visible substance given up by the nucleus to the cytoplasm.

The very fundamental investigations of Richard Hertwig^{45 47} have given a very important aspect both to the general question of the relation between nucleus and cytoplasm, and the special one of the pigment genesis. I cannot refrain from going more into detail into the literature of this question, although it happens for the present to deal chiefly with lower organized animals. But a beginning has been made of the transference of these findings to the metazoan cells, and there is promise of many new and important conclusions about the metabolic relation between nucleus and protoplasm.

The investigations of R. Hertwig were confined to the protozoa. In 1898 he⁴⁵ found the protoplasm of *Actinosphaerium eichorni* full of chromatic bodies, often in strands, to which in 1902 he gave the name "Chromidia." These bodies were derived from the nucleus and played an important part in the life of the cell. They increased in number following excessive feeding as well as great starvation. Their relation to the nucleus was made especially manifest by the fact that under certain circumstances it would be entirely resolved into the "chromidia." In *Monothalmia* the reverse process is to be

seen. Here, the chromidia appear in the form of a distinct chromidial network which show such a relation to the nucleus that it can be reformed from them.

According to the further investigations of Hertwig, a chromidial apparatus is normally present in the protozoa examined by him and seems to be formed from the chromatin and nucleolar substance. The chromidia of the protistan cells, according to his opinion, are comparable to those chromatin particles which are extruded from the nucleus during the fertilization of the metazoan egg cells.

The chief results of his investigations have been expressed by R. Hertwig in the sentence "In every cell there is normally a distinct correlation between plasma and nucleus," and to this he gave the name "Nucleoplasma relation."⁷⁴ The metabolism of nucleus and plasma is explained by Hertwig in this manner. The nucleus takes up portions of the protoplasm, dividing it into a functioning substance, and a portion taken up by the nucleus. The resulting increase in the nucleus he calls "The functional growth of the nucleus," which under pathologic conditions may go on to a hypertrophy. There is then an imbalance between nucleus and plasma, which later finds its equality in a cessation of assimilation and loss of nuclear contents through resorption and through giving up of its contents to the plasma. In such cases the "nucleoplasma" relation is restored by extrusion of the chromatin into the plasma, where under certain circumstances it is converted into a brownish mass.

The transformation of chromatin into pigment was observed by R. Hertwig in *Actinosphaerium*. It appears under different conditions: in encysting, excessive feeding and hunger; that is, whenever naturally or artificially the balance between protoplasm and nucleus is disturbed. If the nucleus in its relation to its surrounding cytoplasm increases beyond a certain amount, a portion of the chromatin must be given up to the plasma in order to restore the balance. The extruded chromatin or chromidia, as these chromatin masses will henceforth be called, are either resorbed and used or converted into brown pigment granules.

As a result of these investigations of Hertwig and the clear and logical conclusions drawn from them, new points of view are provided for the entire cytology. But more data are needed

for the confirmation and amplification of Hertwig's theory. Now that the ban has been broken which heretofore made most authors regard as impossible a passage of particles of nucleus into the cytoplasm, the time has come to test older theories for their correctness and to bring them into agreement with Hertwig's.

There remains the examination of the ever-recurring question of the relation of certain specific structures in the glandular cells to the nucleus.

M. Nussbaum⁸⁴ described in the pancreatic cells of amphibia threadlike bodies which he called paranuclei and compared to those which are found in the spermatides and yolk cells of the egg. Similar characteristic cells, deeply staining with chromatin coloring stains, were seen by Gaule^{26 28} in the blood cells, pancreas and liver cells of the frog. Ogata⁸⁷ claimed that they consisted of bodies which passed from the nucleus into the plasma. This was energetically opposed by M. Heidenhain. Platner⁹¹ thought these paranuclei had something to do with zymogens and found that they disappeared when the latter appeared. Similar statements were made by Mathews⁷⁰ as the result of careful study of the pancreas cells of *Necturus* and the liver cells of the frog. All of these authors agree that the structures in question are strongly chromatic, are probably composed of a nuclealbumin, and are directly derived from the chromatin of the nucleus. Laguesse⁶⁵ has discussed the manner of their derivation from the nucleus. He says they are formed by unequal (heteropole) nuclear division. He considers them "a kind of nutritive contribution from the nucleus to the protoplasm."

As cell structures probably comparable to the chromidia of the protistan may be mentioned the "mitochondria" of Benda¹⁰. They are granules which he found in the seminal cells and which are distinguished from other bodies in the cells by special methods. They form the spiral threads of the sperm cells. After additional study of hair and muscle cells, Benda considered them to be a specific motor apparatus. Meves⁷⁹ made a number of important observations on the so-called chondromita, which are granular threads composed of mitochondria. They are regularly found in spermatogenesis.

Other differentiations of the cytoplasm may be mentioned here; the so-called pseudochondrosomes, the central capsule

(also called centroformia and "archoplasmaschleifer") under which names are described structures more or less belonging together. Their morphologic and staining resemblance to true chromosomes is evident. Nevertheless, M. Heidenhain⁴¹ insists that they arise in the cytoplasm, while Folke Henschen⁴² considers them as derivatives of the nucleus.

Likewise, many authors group here the trophospongia described by Holmgren,⁵¹ at least that deeply staining network which has a different appearance according to the functional state of the glandular epithelium, and which can be stained with nuclear stains.

It must be settled, also, whether the bodies called by v. Lenhossék "tigroid," which vary in appearance according to the functional state of the ganglion cell, are really related to the chromatin of the nucleus, or as many think are identical with it. Even M. Heidenhain⁴¹ recently said that "the tigroid is in all probability a cytochromatin, and therefore we are compelled to investigate whether the tigroid is to build up the nucleus when its volume is relatively small" (p. 870).

Finally we must refer to the "apparato reticolare" described by C. Golgi in 1898, which forms a distinct network in ganglion cells treated with chrome-silver. Later Negri⁸¹, Pensa⁸⁹ and Kopsch⁶¹ showed this network in different glandular cells treated by the same method, while similar findings were reported by Marenghi⁶⁹ in the epidermis cells of *Ammocetia* and by Veratti¹¹⁰ in the cross striped muscle fibers of the larva of *Gastrophilus equi*.

The theory of Hertwig about the chromidial apparatus received additional extension by the contributions of his associates and scholars.

Here should be mentioned the interesting communications of Goldschmidt.²⁹ His investigations were upon the common spoolworm, *Ascaris lumbricoides* L., *Ascaris megalocephala* Cloqu. It was the first attempt to apply Hertwig's observations to the metazoan cells.

The tissues of *Ascaris* are partially distinguished by the fact that they do not grow by cell division but by an enormous increase in the size of a few cells. According to Goldschmidt, the round esophagus, holding 7 cc., was composed of 33 cells, the excretion organ of 3 cells, the end gut, the lips, and the spicula apparatus of a few rather large cells. Naturally all these cells show all kinds of important functional structures.

The great development of the chromidial apparatus makes it very suitable for an investigation of the subject under discussion. According to Goldschmidt, the structure is found only in cells with active functions, i. e., epithelial muscle cells, body muscle cells, muscle cells of the inner organs, absorbing epithelium, and gland cells. The chromidial apparatus consists of a system of threads, chromidial threads, chromidial bands, which show a typical reaction, structure, and arrangement within the cytoplasm. They stain deeply with the same degree of color as the chromatin of the nucleus. The individual threads run through the cytoplasm, usually greatly twisted, are of varying circumference, and usually finely vacuolized. The threads are always thickest in the region of the nucleus, which they may entirely surround. Furthermore, direct relationship with the nucleus can be made out; the threads are deposited upon the nuclear membrane and possibly penetrate into the nucleus. At times, chromatic bodies pass out of the nuclei, which are accompanied by a new formation of chromidia.

But of special importance are the findings of Goldschmidt concerning the structure of the chromidial apparatus, varying according to the functional state of the cell. Sometimes it is greatly developed, sometimes slightly so, or even entirely absent. This can be proven to depend on the functional state of the cell. It is the rule that cells of important functions are richer in chromidia. They appear in the gland cells only when the nucleus is at rest, and disappear entirely when it comes into metabolic relations with the plasma. They appear in the intestinal epithelium only when the cell is actively functioning, as shown by the presence of food; they disappear in starved animals, i. e., when the intestinal cells are not functioning. In the muscle cells, Goldschmidt was able to show their direct connection with the function by experiments. When actively functioning (tetanus, alcoholic irritation) they greatly increase and finally disappear, following excessive use, without the possibility of replacement.

As can be seen from this brief review of Goldschmidt's investigations, there is an agreement between the chromidial apparatus of the protozoa and that of the lowest forms of metazoa, not only morphologically, but also in dependence upon the functional state of the cell.

The first attempt to make an exact examination of pigment formation in melanosarcomata, in the light of these new discoveries, was made by R. Rössle²⁸, and was carried out under the personal direction of Hertwig.

The most important finding agreed with his whole opinion as to the pigmentation processes in these tumors: the large amount of nucleolar substance in the nucleus. This overproduction of nucleolar substance was not so distinct in unpigmented round cells with a small amount of protoplasm as in the pigmented spindle and round cells, especially those where the amount of pigment was not so very great, i. e., those apparently caught in the process of pigment formation. In other cells, the nucleolar substance was found in active formation and changing. In such nucleoli were found budding off of drops, formation of chain and goblet forms, and vacuole-like spaces. In addition, Rössle thinks he could demonstrate the passage of the nucleolar substance out of the nucleus and its change in the protoplasm into pigment.

The typical pigmentation according to him is as follows: The nucleus which in a young stage is still rich in chromatin, but poor in nucleolar substance, as the cell grows over a certain amount, becomes poor in chromatin but at its expense rich in nucleolar substance. Rössle designates these stages as follows: The large unpigmented round cell (I stage). In this stage, mitoses often are found. In this way arise unpigmented round cells with relatively large, vesicular nuclei with numerous large nuclear granules. Later, the cell grows apparently very rapidly and typically, in that the plasma distinctly increases in amount, forming processes. This is the stage of the unpigmented large spindle cells (II stage). In all of these stages of development, the staining of the nucleus often distinctly shows the active conversion of the chromatin into nucleolar substance, since the nuclear network, originally staining blue with hematoxylin-eosin later has a distinctly reddish violet color.

As soon as most of the chromatin has been converted into nucleolar substance, there appears in the nuclear fluid a huge nucleolus. While the increase in nucleolar substance goes on, the protoplasm sends out more fine processes. This is the stage of the unpigmented chromatophore (III stage).

Now the pigmentation begins. Particles pass out of the

nucleus which give the staining reaction of nuclear granules, and later surround the nucleus with a brownish black mantle. In this way there soon appears the typical chromatophore (IV stage), the large cell, rich in protoplasm, with an oval vesicular nucleus, and long, band-like processes, which contains pigment.

Although the cell body is now deeper colored, it retains at first its specific ameba-like form. Soon, however, it loses its processes, and the cell attains the form of a blunt spindle. This is the stage of the pigmented spindle cell (V stage).

From here on there are two possibilities: either the spindle form is retained while the cell becomes smaller and both absolutely and relatively more pigmented. These cells arrange themselves parallel to the alveolar septa, so that they seem to form a part of them and aid in making these appear broader and richer in pigment, and in hiding the border between stroma and tumor mass. These give the appearance of a deeply pigmented spindle cell sarcoma. In this form, the altered chromatophores, greatly decreased in size, dark colored and with small nuclei, can remain a long time. Or the pigmented cells can round themselves up and become smaller in toto (pigmented round cell) until the coloring matter is converted into completely opaque, almost black masses completely hiding the nucleus.

The malignant cells are the young forms of melanosarcoma cells which, according to Rössle's opinion, are characterized by an overproduction of nucleolar substance. In addition to this manner of pigmentation, there is another one which Rössle calls pigment degeneration. The nucleus loses its content and the extruded nucleolar substance is changed within the cell body into a mass of pigment. But since the cells suffering pigment degeneration do not divide, this kind of pigmentation is of no importance in the question of tumor growth. In these cells the usual comparison of the tumor cells with embryonal cells is correct, but the degeneration is something which has no connection with the growth of the tumor.

As to the dependence of pigmentation upon the blood vessels, Rössle claims it is an indirect one only. Large thin walled vessels, as well as all kinds of circulating disturbances (especially stasis) influence the nourishment of the sarcoma cells in such a way that pigment formation follows. While

with normal capillary nourishment the sarcoma cells apparently can indefinitely subdivide without change of their morphologic character, this ability is lost as soon as their growth brings them into the region of a large thin walled vessel (precapillaries) or lymph vessel. The same thing happens as soon as a new permeable vessel is formed in the tumor. In such areas there appears at once an overnourishment whose result is cessation of division and pigment formation.

Staffel (1906, *Münch. med. Wochens.*) confirmed the findings of Rössele in melanosarcoma by his work on xeroderma pigmentosum. He lays the chief stress on the appearance of the nuclear substance in the plasma, without in our opinion having given any great proof of his claim.

The list of these communications includes a monograph by E. Meirowsky⁷⁶ which lately appeared.*

This author usually fixed his specimens in absolute alcohol, and after embedding in celloidin (sometimes in paraffin), stained the sections by the methylgreen-pyronin method which was described by Pappenheim and modified by Unna.

Pieces of skin, pigmented tumors and embryonal eyes prepared beforehand in different ways were examined. He found wherever it came to a pigment formation, that there was an increase in the pyronin-red nuclear substance. By this he means the nuclear substance which was colored red by the pyronin which he used for a stain. In the stages that followed, the nuclear substance partially overflowed into the nuclear membrane, but for the most part was extruded into the cytoplasm. The pyronin-red nuclear substance appeared in the protoplasm in the form of either globular, finely granular or variously formed particles. When the pigmentation appeared, all color differences from that of the pyronin-red nuclear substance to that of a deep black of the similarly formed pigment particles were found.

From these findings, Meirowsky concluded that the red nuclear substance was converted into pigment.

As to the nature of the nuclear substance which was colored red by the pyronin, Meirowsky thought it was chiefly nucleolar substance, but not exclusively so, since at the same time other parts of the nucleus are colored which have the physical and

*The earlier works of this author on the same subject are noted in the literature.

chemical properties in common with the nucleolus of accepting the same stain. He calls the red nuclear substance which he found took part in pigment production by the indifferent name "pyrenoid" (according to Jäger, more properly "pyronoid").

Jäger⁵³ in a recent work opposed the albuminous nature of the pyronoid substance of Meirowsky. It is rather an aliphatic combination, that is a fat like body, which changes into myelin.

Upon the proof of its fatty nature, the pyronoid substance is of course excluded from the problem of the melanin genesis. He insists that morphologic factors play no role in pigment formation and evolves a chemical theory which has already been described.

The polemic between Meirowsky and Jäger⁵⁴ which followed brought no new light upon the question.

II. DESCRIPTIVE PART.

The following investigations were carried out on embryonal vertebrate eyes and melanotic tumors of human eyes. Only well preserved material was used. I still insist on the point which I made in an earlier work,¹⁰⁹ that fixation is by far the most important part of histologic technic, in comparison to which the staining plays an inferior role. Whenever possible, I give the simplest methods of the latter the preference.

I have used as a fixation fluid chiefly Zenker's fluid, concentrated sublimate-glacial acetic, Flemming's mixture and Lenhossék's solution. Special attention should be paid to the fixation period, which need not extend over several minutes in the case of small specimens. The exact description of this part of my technic as well as that of the embedding method is contained in my work mentioned above.

Furthermore, I have laid special emphasis on the use of the staining methods easiest to carry out, in the demonstration of the structures to be described. Fortunately, the Delafield's hematoxylin-eosin method is very serviceable. As supplemental, and for special points, numerous sections were stained with R. Heidenhain's iron-hematoxylin method, van Gieson's hematoxylin-acid-fuchsin-picric acid stain, Ehrlich's triacid stain and the Unna-Pappenheim's methylgreen-pyronin stain.

I will begin with the description of the pigment development in embryonal eyes.

Our knowledge of the development of the pigment in the

eye has been greatly changed in the last decade. The older authors, whose works appeared before the seventies of the last century, were entirely ignorant of the genetic difference between the pigment epithelium and the choroid.

Remak⁹⁵ still believed that the outer layer of the optic vesicle was the common anlage of the choroid, ciliary process and iris. Kölliker⁵⁹ was the first to show that the pigment layer of the retina "was developed from the external layer of the secondary optic vesicle." From the same author came the discovery everywhere accepted today that the pigment layer on the posterior surface of the iris came from the same matrix, i. e., that the posterior iris pigment is homologous to the "retinal pigment" of Babuchins.

The true statement of Kölliker was for a time obscured by the erroneous contradictory claims of Arnold⁵. According to the latter, the pigment of the optic vesicle arose not in the pigment layer, but as a special layer between the two layers of the optic vesicle, accompanied by a simultaneous atrophy and eventual complete disappearance of the outer layers.

This error of Arnold was cleared up some years later by the beautiful work of Kessler⁷⁸. The origin of the pigment in the eye was so completely worked out by this investigator that later authors have added nothing of importance to it.

The later communications have therefore been confined to statements as to which place the pigment first appears and to what direction it extends later. Different species of animals show difference here. M. Nussbaum⁸⁶ was right, however, when he ascribed little importance to these questions. All that we know is expressed in the sentence—the outer layer of the secondary optic vesicle develops into the pigment layer of the retina. As to the manner in which this takes place, we have at present no correct explanation. He says (l. c. p. 16): "The question does not become simpler if we dogmatically say much about such processes. At present they can be only noted, not explained."

An attempt to bring the nucleus into relation with the genesis of melanin in the pigment epithelium of the eye was made by Meirowsky,⁷⁶ whose work was discussed in the INTRODUCTION. His demonstrations on the pigment epithelium of ox embryos must be classed on this point as very fruitless. The explanation given at the end of the chapter make the technic of the

author less trustworthy: "Furthermore, numerous experiments were made on the fertilized hen's egg, and the formation of retinal pigment studied on this specimen. It proved not suitable for the study of pigment formation, as the tissues were too rich in water to be fixed exactly."

The latest work along this line is that of Seefelder,¹⁰⁷ who did not advance the solution of the problem much indeed, but at least had the advantage of making his observation exclusively on series of well preserved human material, which were put at his disposal by their possessors.

He found the first appearance of pigment development in human embryos of 6.25-6.5 mm. length.

In these it is found both in the basal as well as the free parts of the protoplasm in the form of very small, yellowish brown, round drops or short rods, which strongly reflect the light. In this very early stage they are found exclusively in the region of the dorsal (upper) zone of reflection, while they are entirely absent on the ventral side. Also, they are not visible in the cells lying directly next to the zone of reflection, but appear first in the cells which lie somewhat posteriorly (about the fourth or fifth layer of cells), counting from the zone of reflection. From here to the region of the equator bulbi, cells are found which already contain pigment granules. But it cannot be said that their number decreases from the zone of reflection to the equator, as many of the cells in the region of the equator contain much more pigment than those which lie near the margin of the optic cup. In general, the free (inner half of the cell) is more strongly pigmented than the basal, but the difference is very little and scarcely visible. Seefelder found the intensity of the pigmentation very different. The color varied from a very clear yellow to a beautiful chestnut brown.

In regard to the statement of Rabl⁹¹ that the pigment in the cells of the tapetum nigrum, like that of all pigment epithelium, appears only at the free side, Seefelder finds that this is not true in man. Likewise, he does not agree with the statement of Scherl¹⁰³ and Krückmann,⁹² that the retinal pigment in birds first appears at the basal side. He always found the first traces of pigment scattered over the entire pigment epithelial cell. After a short time in the chick, only the basal part of the cell contains pigment while the free part is entirely

unpigmented. But the later condition is different in man. In correspondingly old stages of development, the pigment is almost the same in quantity in the outer and inner parts of the cell.

The amount of pigmentation increases rapidly in the course of the evolution. The increase consists in an increase in the number and size of the pigment granules and in a darker color of the pigment.

The division in the pigment epithelium takes place in the earliest stages, according to Seefelder, only by mitosis. About the end of the third month, the number of mitoses in the pigment epithelium decreases considerably. From this fact, and from the presence of numerous multinuclear cells, Seefelder concludes with great certainty that there is a great amitotic cell or nuclear division in the human fetus, especially in the fifth month of pregnancy.

As to the nature of the genesis of the pigment, Seefelder could report nothing definitely even in the earliest stages. On page 432 he says, "One is simply confronted by the fact that it is present, without being able to see whence it has come. In spite of careful examination of the neighboring unpigmented cells and their vicinity, I was unable to observe any changes which could be brought into relation with the processes of pigment formation." On page 433 he says, "I do not therefore enter on the question of the genesis of the pigment epithelium (this should read pigment) as I can propose no clear hypothesis."

The most favorable material for the examination of the genesis of the pigment in the eye of the chick is, in my opinion, embryos of the fourth or fifth day of incubation.

The pigment appears chiefly in the form of thin rod like structures. In addition, there are occasionally found round and spindle formed pigment bodies. The collection of the pigment rods in the region of the basal periphery of the cell is very evident, that is in the region where even in this early stage the eye is surrounded by embryonal choriocapillaries. But it must be at once confessed that at no stage in the development is there found a direct connection between these early pigment particles and the outer blood vessels.

An important finding which must be of importance for the whole subject of pigment genesis is the fact that in addition

to the pigment rods there are also present bodies of identical size, form and appearance which at this stage show no signs of pigmentation. The elements within the cell stain deeply with all nuclear stains. Since in the same field the transition of these chromatin holding bodies into true pigment bodies can be followed step by step, there can be no doubt that they correspond to an earlier stage of the pigment.

Further investigation led to the new and interesting discovery that the unpigmented chromatin holding rods in the cytoplasm of the pigment epithelium of the chick are directly derived from the nuclei of the cells of the external layer of the optic vesicle, the so-called pigment layer. Their development takes place as follows, as seen on various microscopic sections:

When the cross section of the nucleus is seen to the best advantage there is often found a very small, delicate process extending from the nucleus, which resembles a very fine duplication of the nuclear membrane. The structure of the nucleus is in no way altered by this process; the chromatin shows the usual picture of a resting cell at this place. It shows no sign of function by an increase in the staining power of its vicinity. In this stage there are one or two nucleoli present, one usually in the middle of the nucleus and the other more or less peripheral.

There is no preference as to the basal or the free part of the cell. In another place a similar process is seen arising near the free periphery of the cell.

In most cases a direct connection can be demonstrated with the chromatin of the nucleus, in the sense of a continuous relation. In a few cases the process can be followed as far as the nucleolus.

Another section can be called a lucky one, as here the whole process of development can be seen in a few cells. There is a distinct lateral process whose connection with the chromatin of the nucleus is indisputable. Downwards towards the free surface is such a process in the process of detachment. A delicate thread still joins it with the place of its former attachment. This chromatin rod just cast off, is still entirely unpigmented, as are a part of the structures of similar appearance which lie free in the cytoplasm. All stages are to be seen, from the entirely unpigmented chromatin particles to the complete pigment granule.

The processes, while still in connection with the nucleus, can grow to imposing length, and in this condition the pigmentation frequently has already commenced at the distal end. The change by which the chromatin rods are finally converted into the so-called pigment begins at one end, in rare cases simultaneously at both ends, so that there is for a short time a clear area in the middle which accepts the chromatin stains.

The nuclei in other sections show large processes which belong to a somewhat older stage of development. In one, the pigmentation of the large chromatin process, which is still joined to the nucleus, is quite pronounced. But in another, the smaller of two nuclei shows a process whose form indicates an earlier stage, which begins the series, only here the change into pigment has already begun.

Another section shows on a process directed downwards (towards the retina) the rare appearance that the pigmentation frequently also can appear at the medial part of the process, i. e., where the rod's base is still connected with the nuclear membrane.

This series includes a section of the chick's pigment epithelium, consisting of four cells. The nuclei have numerous processes; one nucleus has two such processes arising very close to each other, whose connection with the chromatin matter is very distinct. The number of processes which at the same time arise from a nucleus is usually one or two; in rare cases three are also visible, though they usually show distinct differences in time of development.

In another section are some stages of mitosis from the pigment layer of the chick of the fourth day of incubation. I shall not go into the details of all stages of mitosis, but shall merely call attention to those processes of mitosis in the pigment layer of the chick which indicates the relation between the nucleus and the melanin.

For some time before the actual division of the nucleus takes place, extensive changes can be seen in such cells. The cells which lie on the surface directed towards the lumen of the optic vesicle become rounded, the chromatin of the nucleus becomes grossly granular and in places forms finer or coarser processes. In the succeeding stages, which can be called the prophase of mitosis, the nucleolus has entirely dis-

appeared and the chromatin begins to break up into individual bands. The chromatin processes have become larger, near one nucleus is such a process which has become detached and which begins to be pigmented as it lies in the cytoplasm.

Another section shows a stage which is probably only slightly older than the preceding. The nucleus has only one process, but in the cytoplasm are two detached chromatin particles, and on the other side near the nucleus are two pigment granules of the same form and size. The law, which I later will confirm by other findings, is very evident, namely, that the first pigment bodies to appear, with the exception of the coloring matter are absolutely identical morphologically with the chromatin particles.

During the metaphase of the mitosis the rodlike chromosomes frequently become longer and some become detached and lie at some distance from the nucleus. The pigmentation begins at once in such displaced chromatin bodies, while new ones are being constantly added from the chromosomes which have gradually arranged themselves around the equator. This free extrusion of chromatin particles followed by pigmentation during the mitosis, has the result that the older stages of the mitosis in the external layer of the chick's optic vesicle are characterized by an especial richness in pigment particles.

Later, I will try to give a satisfactory explanation for this peculiar process of chromatin extrusion during mitosis.

I will now take up the development of the pigment in the mammalian eye, as studied in the eye of the rabbit. The best stages are those from the deep lenticular groove to that of the complete separation of the lens (11, 12, 13 day of pregnancy). In addition, I studied some series of guinea pig, ox, cat, dog, and one from the corresponding stage in man.

The formation of pigment takes place here in a very different manner than in the chick. While in the latter it was a case of extrusion of small particles of chromatin from the intact nucleus, in the former there are extensive changes which in most cases result finally in using up the entire nucleus.

I would like to say here that exactly similar nuclear changes can take place as the result of other degenerative processes, which I will discuss elsewhere.

Furthermore, in order to prevent a wrong judgment of what

I shall now describe, I will at once state that the following cellular degenerations are found only in a number of nuclei, These changes probably affect only those superfluous nuclei which are derived from the originally multicellular outer layer of the optic vesicle. After these changes are completed, the pigment layer is composed of a continuous layer of nucleated epithelial cells which have taken up the pigment formed from those remnants of degenerated superfluous nuclei.

Another cross section shows the pigment layer of a twelve-day-old rabbit embryo. The nuclei are arranged in two rows, and the cellular borders are only indicated. The large, vesicular nuclei contain a rather equally distributed mass of chromatin with several (usually 2 to 4) nucleoli. In addition to these intact, normal nuclei are others in the same section which seem somewhat shrunken, while the chromatin has begun to gather in deeply staining globules. In cellular pathology this would be called karyorrhexis. In addition to these shrunken deeply staining nuclei, some chromatin globules are seen free in the cytoplasm. Since all intermediate stages between these latter and deep black pigment particles of similar form and aspect are present, there is no doubt that these chromatin bodies are an early stage of pigment and themselves are derived from the chromatin of the nucleus.

Another section shows this method of development very beautifully. Scattered among a number of normal nuclei are those which form the different steps in the development of the pigment. The nuclear membrane persists while the chromatin has broken up into larger or smaller masses. What gives special importance to this picture is the fact that the pigmentation has already commenced within the boundaries of the structure which as the remains of the nuclear membrane encloses the chromatin masses.

I must here make a statement of general importance concerning the boundaries of the individual cells in this stage. It must be made here, as it explains the later fate of the free masses of chromatin.

My view, based on numerous observations, is that the embryonal cells in this stage are not sharply demarcated, but form a so-called cell syncytium. This is especially marked in the pigment epithelium of the eye. In this stage of great growth, with a high degree of nuclear displacement, cellular

outlines cannot be made out by the very best methods. There is an exception perhaps in those cells which undergo mitosis and are usually more or less distinctly demarcated from the surrounding ones.

From this results naturally the conclusion that the protoplasmic rests and chromatin globules of the cells which form the pigment are taken up by the neighboring cells and assimilated or preserved as pigment bodies.

In another section the lack of cell definition is very evident. The dark round bodies consisting usually of two to four globules are nuclei caught during the process of conversion into pigment. It is entirely impossible to assign them to any definite cells.

Often the chromatin bodies, which come from any one nucleus, and for a time remain associated with a less compact substance staining with plasma stains, lie in chumps. Some of these bodies then show more or less distinctly a pigmentation before they migrate.

The division of the pigment on its first appearance in the eye of the mammalian embryo follows no special rule. Frequently the pigment bodies are found first in the region of the original free surface. Usually, however, they are equally distributed over the entire section.

A few words concerning the massing of pigment bodies. They are formed by the simultaneous conversion into pigment of two or more neighboring nuclei. Spaces in the protoplasm are formed, which are filled by more or less large chromatin bodies which after the pigment change has been completed form the masses of pigment spoken of.

Two succeeding stages are found in two other sections. In the first, the shrunken nucleus lies within the liquified cytoplasm, its chromatin having taken on the form of globules. The next section shows the succeeding stage of breaking up into fragments and becoming pigmented. The nuclear membrane has been ruptured, and chromatin bodies, in part already intensely brown, are migrating into the region of the intact neighboring cells.

In addition to the chromatin degeneration of the entire nucleus, there can be frequently seen the migration of the nucleolus from the otherwise intact nucleus. This process, which is not confined exclusively to the pigment layer, but

which occurs very widely distributed through the embryonal anlagen in this stage, occurs as follows: The nucleolus which lies peripherally at some places pushes out the nuclear membrane, frequently causing the chromatin in its region to appear somewhat cavernous. In the next stage, the nucleolus projects further out into the surrounding cytoplasm, drawing out the nuclear membrane into the shape of the neck of a bottle. Finally, it is entirely detached from the nucleus and lies free in a depression in it.

An especially vigorous production of chromatin globules takes place in the transition region of the pigment and retinal layers, following mitosis, which, as is well known, has a tendency to appear especially in that location.

In another section, there are three nuclei which show three successive prophases of mitosis. It begins with the conversion of the chromatin substance in the nucleus, the so-called chromosomes, into globules or droplets. In this stage usually belongs the extrusion of chromatin particles. This is seen very distinctly in the next section.

A not unimportant point, of general interest, is the question whether the developed pigment bodies are lifeless cellular inclosures or whether they are to be regarded as living bodies. I think I can with certainty take the latter position, since I was able to observe an increase in the number of pigment bodies by means of their fragmentation.

In describing the chromatin extrusion in the course of mitotic nuclear division in mammalian embryos, I have purposely not confined myself to the pigment layer of the eye. I do this in the first place, because this is by no means a process which occurs only in connection with pigment genesis, and in the second because the extension of the phenomenon of chromatin extrusion to a larger group of embryonal cells gives, in my opinion, a better understanding of analogous processes in malignant tumors of the adult.

I will describe such a series of mitotic nuclear figures from the wall of the midbrain of a twelve day old rabbit embryo. It begins with the disappearance of the nucleolus and the formation of the so-called chromosomes which are shown here as droplets, by means of the technic used. The nuclear membrane still persists in this stage. Soon, however, it becomes indistinct in places, and this is followed by migration of the

chromatin droplets. At the same time, the cell which is dividing begins to become more sharply demarcated from its neighbors. In the next stage, the extrusion of chromatin increases, accompanied by a displacement of such chromatin bodies. They at the same time undergo a distinct decrease in staining power, which increases more and more. Although in the beginning, they accepted the nuclear stains as intensely as the chromosomes of the nucleus, their staining power decreases with the age of the mitosis, until they finally stain only with eosin, in the same color as the cytoplasm. The last members of the series show this condition distinctly. But even in the very last, which show some nuclei in the telophase, the extruded chromatin bodies are recognizable as compact globules in the cell plasma, staining reddish with eosin.

Just a word about the action of the nucleolus during nuclear division. We have seen that it usually becomes indistinct during the prophase, and no longer accepts stains. The time of its disappearance, however, does not seem to be related to any fixed phase of the division. I have at times been able to find it in rather late stages of mitosis (when the daughter segments are completely formed). I have found it as a coarse globule in the cytoplasm, staining with eosin. In another section, a body in the cytoplasm showed a distinct resemblance to the degenerating nucleolus which O. Hertwig found in *Limax maximus*.

In regard to the question of the genesis of the choroidal pigment, I should like to make a few remarks. This question is of great importance in the consideration of the primary malignant tumors of the choroid. I would recall the opinion expressed by Th. Leber some years ago in regard to the association of the pigment epithelium in the genesis of the choroidal tumors which has been brought up again very recently by Wieting and Hamdi¹¹³. According to them, the melanoblastomes of the interior of the eye arise in the epithelial elements of the retina. They are true neuroepitheliomata which arise from cell complexes which have been displaced into the choroid, and are perhaps only malformed elements in the sense expressed by Schwalbe and Borst.

The sarcomatous nature of the malignant melanomata, which ophthalmoscopically is unassailable, must, according to the views of Wieting and Hamdi, undergo a revision in the light of developmental and comparative anatomic observations.

These authors even entirely deny that the choroid has the power of pigment development. According to Wieting and Hamdi, primary melanotic pigment formation takes place only in the epithelium.

At this point we come upon a question which up to the very present has been argued from two diametrically opposite standpoints. It is the question of the origin of the pigment cells in the epithelial layer.

The pigment present in the epidermis was supposed to be of cellular origin, since no blood vessels are present. Kölliker²⁰ spoke of the possibility of pigmented connective tissue cells migrating out of the cutis. Of the cells of ectodermal origin, Kölliker ascribed the power of pigment formation only to the pigment layer of the retina and the pigmented nerve cells. All other instances were cases of pigmentation from migration of pigmented cells from the neighboring connective tissue, between the epithelial analgen. Aeby, Kölliker, Riehl, Karg, etc., explain the pigment cell as derivations of the ordinary connective tissue cells, while Ehrmann¹⁹ claims that they are special mesodermal pigment forming cells (melanoblasts).

A logical extension of this theory of secondary pigmentation of the epithelium from the connective tissue meets with many difficulties. Discoveries have been made which not only do not fit in with it, but even seem to prove the very opposite.

This muchly debated pigment question has found its pet object in the nevi. The latest investigator of the pigment genesis in the nevus, Favera¹⁶, states that the chromatophores are invariably of epithelial origin. He gives a number of proofs—the elements which we call chromatophores are not distinguishable from other epithelial elements; they lie between the epidermal cells; they suffer the same swelling; and they show the same degenerative processes as the epithelial cells of the nevus. He, therefore, agrees with the recently expressed opinion of Wieting and Hamdi, that these chromatophores are specially differentiated epithelial cells in whom the power of forming pigment is better developed than in other epithelial elements.

M. Wolfrum¹¹⁴ has recently contributed a work on the nevus of the conjunctiva and the choroid.

In regard to the pigment of the egg of *Rana esculenta* and *temporaria*, K. Wagner¹¹² very recently has shown that at the

time of the first appearance of pigment in the egg there are no primary melanoblasts present which could carry the pigment from the stroma of the ovarium into the egg, but that the pigment was formed in the egg itself.

Furthermore, it should be stated that the last named authors, who claim that the pigment arises in the epithelium, hold that it is very probable that the nucleus takes part in the genesis of the pigment, without having furnished any definite proof of this assumption. For example, Wolfrum¹¹⁴ says in his work on the nevus of the conjunctiva and of the choroid, "One is often really in doubt if some very small pigment granules do not still belong to the nucleus itself. I will not discuss this question, as it, as well as the question whether the nucleolar substance of the nucleus is a preliminary stage of the pigment, requires special study. At any rate, these findings indicate the correctness of this assumption." (p. 239.)

The theory of Wieting and Hamdi, that the true melanoblast of the fundus oculi are of epithelial origin, assumes that the stroma cells of the choroid do not possess the power of forming pigment. According to them, the pigment normally arises exclusively from the pigment layer of the retina. Carried to its logical conclusion, this theory allows the recognition of a "melanosarcoma" of the choroid only when it is shown that by means of a passive, physiologic impregnation with pigment, the connective tissue themselves acquire the power of forming pigment.

This theory is in so far untenable that it is impossible to deny to the connective tissue cells of the choroid the power of spontaneous pigment formation.

As to the pigment genesis in the choroid, ciliary body and iris, my observations allow the following to be stated: The pigment of the uvea has a twofold origin. In the first place, a number of cells in the region of the iris and ciliary body pass from the pigment epithelium into the surrounding connective tissue. In the formation of such pigmented wandering cells, the whole anterior segment of the pigment layer of the optic vesicle, from the pupillary border to the ora serrata, takes part. The migration of individual pigment cells and groups of cells takes place over a large area in the first 14 days of development of the chick. In man, this process begins at the end of the third month, and is not completed at birth. The

first statement in regard to the origin of pigmented wandering cells was made by W. H. Lewis. Elschnig and Lauber argued for the derivation of the so-called "cell groups" in the iris of adults from the pigment layer of the retina.

The greater part of choroidal pigment arises entirely independent of the pigment epithelium, in the layer dividing the choroid and sclera, in the posterior segment of the eye. The first trace of pigment of connective tissue origin, in contrast to that of ectodermal origin in the ciliary portion, is seen at some distance from the optic disc. The most important proof of the independence of the true choroidal pigment of the pigment cells of the optic vesicle is the fact that the first pigment granules are invariably found in the most peripheral layers of choroidal cells, above the layer of large choroidal vessels, in the location of the later suprachoroidea. From here, the pigmentation gradually progresses inward in the direction of the pigment epithelium. The first pigment granules of the choroidal stroma cells differ very decidedly in color and form from the pigment granules of the retinal pigment cells. Before the appearance of the pigment in the choroid, exactly similar changes could be observed on the nucleus, as were shown by certain cells in choroidal sarcomata examined by me. The pigment of mesodermal origin appears in man shortly before birth or even later, and reaches its complete development only in the course of the first year of life.

From this it is clear that, contrary to the view of Wieting and Hamdi, there is no question that the choroid has the power to form pigment. We are therefore justified in speaking of melanosarcoma of the choroid until it has been proven without the shadow of a doubt that such a tumor takes its origin from the pigment layer of the retina. This proof has not yet been given.

I will now return to a description of my own investigations.

Following my examination of embryos, I made an examination of the melanotic tumors of the eye, in the light of these new points of view. In general, there was an agreement with the embryonal pigment genesis, in so far that here too the mother substance of the nonhematogenic pigment could be traced back to the nucleus.

The very well preserved material was furnished to me for this investigation by my honored chef and teacher, Geheimrat

Professor Doctor Th. Axenfeld and Professor Doctor W. Stock, to whom I wish at this point to express my gratitude.

It was a typical pigment cell sarcoma of a slightly alveolar character, with not too rich a blood supply, and in places small hemorrhages.

The pigmentation did not follow a single type, as could be demonstrated in the embryologic material. Out of this chaos of cellular forms I was compelled to search for the phases of pigment formation which were associated.

This was accomplished by making drawings of each cellular form until the pictures fell together in an unbroken series.

I will now describe each one of the developmental stages, and will begin with the pigmentation in the course of mitotic cell division in the melanosarcoma.

I can confirm the statement of Rösle,⁹ that rarely if ever are deeply pigmented cells found in mitosis. Whether only the slightly pigmented and the unpigmented cells are able to multiply, or whether these pigmented melanoma cells again lose their pigment in the prodromal stage of mitosis, I can make no definite statement.

Cells which are destined to mitotic changes are evident a short time before the disappearance of the nuclear membrane on account of significant structural changes. They usually become rounded, the cytoplasm seems more transparent, as though cavernous. Hand in hand with these changes in the body of the cell is a vesicular enlargement of the nuclear wall and a breaking up of the chromatin into droplets. The disappearance of the nucleolus usually takes place during this period. Especial interest is deserved by numerous small bodies in the cytoplasm, which stain intensely with all nuclear stains and show distinct relation with the chromatin matter of the nucleus. Only after the nuclear membrane has disappeared are the mother threads formed. The nuclein droplets lie close to each other, and the stroma stains with eosin. It probably contains portions of the dissolved nucleolus. At this stage, the migration of the particles of chromatin is very plain. The resemblance between the nuclein droplets and the size and shape of the extruded nuclear particles is very evident. It is also very evident in the next stage, when the nuclear segments are arranged at the equator of the spindle which is now indicated. However much I desired by means of counting to

prove an extrusion of chromosomes during mitosis, I was unable to do so, after many attempts. It is unfortunately impossible to prove a constant number of chromosomes in the melanosarcoma cells, even with approximate exactness. The detachment of chromatin particles can be followed to the stage of the daughter stars, in the anaphase of division. I would mention here the "misplaced chromatin particles" described by D. v. Hansemann³⁷ in the course of mitotic nuclear division of carcinoma cells. He considers them as indications of an atypic nuclear division. I will later try to explain this phenomenon in the light of the analogous appearances in rapidly growing normal embryonal cells already mentioned, and will confine myself here to the proof of the general appearance of this chromatin migration in the course of mitotic nuclear division under normal and pathologic conditions.

During the progress of nuclear segmentation, the migrated nuclear particle can greatly increase in size. This is caused by the fusion of two or more chromatin particles, but probably chiefly by active growth of the individual particles, which can by no means be regarded as dead masses after their detachment from the nucleus. Even during the period of their appearance in the cytoplasm they doubtless retain as living matter their power of metabolism and growth, and possibly multiplication, as I showed in the case of pigment bodies in the eye of rabbit embryos.

In the next stage is the beginning of the transformation of the chromatin bodies into pigment. First the affinity of these bodies for nuclear stains diminishes. They become somewhat paler and some of them have a yellowish color. In the next stage, which is characterized by a considerable growth of the particles, all of them have been changed into yellowish brown bodies, in which, however, some black dots are seen. But both here and in the following stage of telophase of the division, there are young unpigmented chromatin particles in addition to the pigmented ones, sometimes intensely so.

As a distinctly different method to that of the origin of the chromidia in the course of mitotic cell division, in the embryos of the higher vertebrates and in tumor cells, I would mention the migration of secondary nuclei from the primary nucleus, in *Aulacantha scolymantha*, a protista, as described by Borgert.¹³ In the beginning, the chromosomes (secondary

nuclei) are differentiated from the chromatin mass of primary nucleus, at the periphery of the nucleus. The nuclear membrane is then completely dissolved and the secondary nuclei gradually pass into the endoplasm. They then appear as small caryosome nuclei, which occasionally still have the ordinary form of chromosomes. Later the caryosomes divide mitotically, each one into from ten to twelve chromosomes. A large part of the chromatin matter, that is, the secondary nuclei formed from the primary one, forms a large nuclear-like inner body which later is dissolved and is to be regarded as a somatic remnant. I mention this finding without comment, simply because it seems to show a distinct contradiction to the changes observed by me in the course of mitosis in vertebrate cells.

Probably the most general and therefore the most important method of pigmentation is the one of which it is the hardest to convince the skeptic. But after careful investigation I feel that I am justified in describing it, and am convinced that it will be found to be most usual method of pigmentation of melanosarcoma cells.

This process is inaugurated by a high degree of extrusion of chromidial substance into the cytoplasm. It is especially prominent in cells with a small amount of protoplasm and relatively large nucleus, that is, in those where R. Hertwig's assumption of a disturbance of the "nucleoplasmic relation" as preliminary to chromidia formation is certainly a correct one. The extruded chromatin mass loses its affinity for chromatin stains, but is still visible as globular deposits in the cytoplasm. The finale is the conversion of the chromatin elements in the cytoplasm into pigment, and the restoration of the normal relations between nucleus and cytoplasm is brought about by a reduction in the size of the former.

While both of these methods of pigmentation in melanosarcoma have the character of active or productive cellular changes, those which are now to be described are characterized by degenerative processes.

One of these methods begins with the migration of the chromatin from the nucleus into the cytoplasm, the nuclear membrane being ruptured in a circumscribed area. The chromatin network soon seems destroyed by the loss.

The nucleolus disappears very early. Finally only the nu-

clear membrane remains, with some chromatin remnants clinging to it. These changes lead to a condition where the scanty remnants of chromatin matter, and only these, have become pigmented.

At times there is a pigmentation of the free unabsorbed nucleoli and the nuclear fluid. There are combinations with the above described chromidia formation with subsequent pigmentation in living cells.

The greatest difficulty in the way of making a correct explanation is the presence of masses of round, deeply pigmented bodies which often appear imbedded in the scant protoplasm in almost incalculable numbers, near and above each other. The size and shape of these bodies about correspond to the small nuclei of the surrounding melanoma cells. These bodies are most numerous in the region of the larger vessels and hemorrhages, and in my opinion are formed as follows:

The point of origin is round cells with disproportionately large nuclei. The middle of the nucleus is occupied by an enormous nucleolus, which even at this stage shows vacuoles, which are explained by most as a symptom of degeneration. These cells with hypertrophied nucleoli are already known in melanosarcoma, and have been described by Trambusti, Oppenheimer, etc. Rössle and Meirowsky, as stated in the INTRODUCTION, laid great stress on them, in their explanation of the pigment genesis in melanosarcoma.

There is soon a splitting up of the nucleolus, while the nucleus becomes hypertrophied and shows a beginning formation of subdivisions at the surface. The cytoplasm is only slightly able to conform to this enormous growth of the nucleus. In this way there is produced relatively large cells, which, however, are almost entirely filled with an enormous, subdivided nucleus, which contains as many as 20 or more nucleoli. Even at this stage fragments are being detached from the nucleus, so that multinuclear giant cells are formed. A confounding of these structures with degenerated pigment epithelium is easily prevented if care is observed.

The enormous growth of the nuclei points to an extensive disturbance of the normal "nucleoplasmic relation." For the production of normal relations a reduction of the nuclear contents is essential. This is brought about by certain parts of the nucleus becoming detached and undergoing degeneration.

This consists in a solution of the chromatin within the nuclear membrane until only a small remnant remains, while the affinity for chromatin stains is lost. Since a nuclear remnant persists usually, we can conclude that it is a reparative process.

Now if such a cell becomes pigmented, and this is a point of greatest importance, there is without exception a remnant of chromatin in the cytoplasm which begins to pigment, causing the original structure of these nuclear derivations to reappear. Next, the pigmentation makes great progress. In addition there are present other forms of nuclear degeneration, in which instead of a decrease in staining power there is found the formation of intensely colored masses. These also soon undergo change into pigment. The nuclear remnant makes a last effort, by mitosis, to obtain the upperhand, but causes only an increase in the chromatin matter, and the pigmentation progresses unchecked.

In this way there are finally formed completely pigmented nuclear conglomerates. I cannot say how much of a role is played by the fusion of several cells.

The multiple fragmentation of the nucleus which accompanies this giant cell formation is a process which may be disregarded, as the ordinary process is much simpler, forming only one nuclear fragment. In a section examined, the normal nucleus, whose relatively small nucleolus lay in the middle, appeared drawn out at one place like the neck of a bottle. Soon this nuclear pseudopod is completely detached from the rest of the nucleus and lies free in the cytoplasm, in a little recess of the nucleus. This picture resembles the so-called Guarnier's bodies in vaccine lesions of the epidermis. Even such small detached fragments of the nucleus are changed to pigment.

The next two series to be described show nuclear structures of the well known degenerative type.

One section shows a nucleus in karyorrhexis. Some slightly colored chromatin globules are present in the cytoplasm which makes one think that the degeneration affected a nucleus in the prophase of mitosis. The same is true in another section, where the chromatin globules lie without the nuclear membrane. Such a nucleus after complete pigmentation is seen in another section.

Finally, a so-called pyknotic nucleus is seen. This at first

stains very deeply, but later loses its staining power more and more. Finally it is changed in toto into pigment, the cytoplasm, as in the preceding form, not showing any trace of pigment elsewhere.

III. DISCUSSION.

If we review the results of the above investigations, it is seen that the most important result is the new and interesting observation that the importance of the chromatic substance in the nucleus of the metazoan cell has been hitherto underestimated. Many observers even to the present day have regarded the nucleus only as the propagation organ of the cell which otherwise remains more or less impotent behind its confining membrane. They have thought that it lies within the cytoplasm awaiting the time for it to take its part in the economy of nature and bring about its greatest wonder, the reproduction of a similar individual.

In this way, to the nucleus was ascribed a different function from that of the protoplasm. For the latter, as the transmitter of the characteristics of the organism, its inherited qualities (idioplasm), the government of the former was a necessary factor in the retention and transmission of the inherited qualities contained in the latter.

The theory that the nuclear substance (the chromatin) must be regarded as the hereditary substance transmitted from parent to offspring is supported by many weighty confirmations. Aside from the fact that the nucleus is the only substance of equivalent mass present during the act of fertilization, in every subsequent karyokinesis there is an equal division of the chromatin between the daughter stars. This process is very favorable to the theory which regards the chromatin as the transmitter of inheritance, because the nuclear substance is always divided into two equal halves and therefore the characteristics of the cell is carried over in equal share to both daughter cells.

A very weighty support to this theory is furnished by the phenomenon of chromatin reduction during ovogenesis.

As is well known, both in the male and female sexual products, the staining nuclear substance has its mass and number of chromosomes reduced one-half. Only by the fertilization, which consists of the fusion of two nuclei, is the complete

number of chromosomes and the total mass of substance again restored. Egg and sperm nuclei are therefore changed by reduction division into a half-nuclei, which by fusion become one nucleus, the germinal nucleus of the fertilized egg cell.

The reduction of the chromatin before the actual fertilization, that is the fusion of sperm nucleus with egg nucleus, is of the greatest importance for the whole problem of inheritance. If we agree with the vast majority of authors, of whom the most famous are Weismann, O. Hertwig and Roux, that the chromatin of the nucleus is the carrier of inherited characteristics, we must accept the fusion of equivalent male and female nuclear masses of chromatin as the most important act in fertilization. This view is supported by fact that the organism produced sexually possesses the characteristics of both parents to about the same degree.

If during fertilization the whole, unreduced chromatin mass were fused, a nucleus would be formed of two-fold chromatin mass and number of chromosomes. Likewise would all segments arising from this nucleus and an altered character of the progeny would be the necessary result of this theory.

In order that there may not be this summation of nuclear substance in the succeeding generations, a reduction of the chromatin must take place before fertilization. If such a reduction did not take place, the result according to O. Hertwig⁴³ would be giant nuclei, and a disturbance in the relation of the nucleus and protoplasm, aside from the conditions untenable from the standpoint of inheritance.

And thereby the problem of chromatin reduction during maturation of the egg leads to another and not less important biologic question, called by R. Hertwig the "nucleoplasmic relation."

Another process in which there is a migration of chromatin matter into the cytoplasm, is the phenomenon of chromatin diminution, discovered by Boveri.

This is the fact that during the process of generation of cells, which arise in *Ascaris megalocephala* from the fertilized egg, at a certain stage in the course of the karyokinesis parts of individual chromosomes are extruded, causing a change in the constitution of the nucleus. This finding of Boveri was later confirmed by numerous investigators, and is present during the ovogenesis of other invertebrates. The manner of

diminution varies a little in the different species. Also, there are differences in so far as the number of chromosomes in the diminished nuclei can remain the same, in spite of diminution, and at other times is only one-half. The process of chromatin diminution is repeated four times in all. The only cell in the 32 cell stage which retains its original nucleus is the primary germinal cell. From it are derived by further simple division the egg and semen cell of the embryo; the other cells which have undergone the "chromatin diminution" give rise to the other tissues of the body (Weismann's soma cells).

Although I do not desire to compare the chromatin migration in the course of mitosis during the normal development of embryos and tumors, which I described in the preceding part of this work, with the processes of important theoretic meaning just spoken of, I should like to mention some superficial morphologic resemblances.

In both cases there is an elimination of a portion of the nuclear chromatin without any special injury to the specific properties of the cell. The findings described by me should therefore cause no wonder or astonishment, as they are not unexampled.

But the theoretic meaning of the phenomenon described by me is another matter. This is bound up with the theory concerning the processes which take place during reduction only so far as the transmitting power is to a certain degree divisible without losing its power of reproducing all. Transferred to my investigations, the rule would run—certain embryonal cells and the tumor cells in melanosarcoma possess the power of giving up to the cytoplasm during mitosis a part of their chromatin without losing their specific properties.

The theoretic meaning of this process must lie along another path than that of the maturation of the male and female product. I think I am taking no false step if I use as an explanation the theory whose most illustrious exponent was R. Hertwig.

I am referring to the "Law of Nucleoplasmic Relation" formulated by R. Hertwig, the substance and meaning of which I discussed briefly in the INTRODUCTION. The most important factor which caused me to explain my findings by Hertwig's theory, is the fact that in every case where there is a migration of chromatin from the nucleus, a so-called chromatin formation,

there is also a disturbance in the normal relation between nucleus and cell substance.

Let us take up the mitosis in embryonal tissue. It cannot be doubted that in the development of the organism, at least in the beginning, in the stage of rapid growth, there is present a considerable excess of nourishment. This overnourishment, as Hertwig clearly showed by his experiments, leads to a hypertrophy of the nucleus. Thereby, the balance between nucleus and plasma is disturbed, and a disturbance of function is inevitable if the natural regulating processes do not intervene. This consists in an extrusion of portions of the overnourished nucleus. These chromatin particles, which are superfluous as long as they lie within the membrane of the hypertrophied nucleus, and even noxious to the cell as a whole, become valuable parts of the cell so soon as they are extruded from the nucleus. Turned over to the cellular protoplasm with its energetic metabolism, its ferments, etc., their valuable material is converted into useful nutrition. Sometimes instead of being assimilated they are converted into important cellular bodies. As an example of this, we see the change of such chromidia into pigment as described in this paper.

The same is true concerning the mitosis in melanosarcoma, where I found the most energetic chromidial formation in the region of blood vessels and hemorrhages, that is just where the nutrient matter is most plentiful. The embryonal character of the melanosarcomatous cells is clearly shown by the rich chromatin production during mitosis.

In discussing the theoretic value of my findings I cannot overlook the question whether it was really an extrusion of chromatin and not the less important parts of the nucleus. I am led to this by the statements of authors like Meirowsky and Rössle, that the nucleolus of the nucleus plays the chief role in pigmentation of melanosarcomata.

Flemming used the word chromatin for that part of the nucleus which stained with certain stains, e. g., the basic anilin dyes. It is the same substance which is found in chromosomes, hence that name. Later M. Heidenhain gave the name chromatin to an entirely different substance which he first called lanthanin, only, since it stained with acid anilin dyes he tried to introduce for it the name oxychromatin, while to the "chromatin of the authors," or the "chromatin of the chromosomes" he sought to apply the name basichromatin.

According to Heidenhain it is possible that one form of chromatin is converted into the other; for example, basichromatin by giving up phosphorus becomes oxychromatin, and vice versa.

S. Rabl, on the other hand, thinks that we should be extremely careful and hesitant in judging the coloring reaction of the constituents of the nucleus and plasma, since at present we have no plausible theory concerning the staining of organic, or more correctly organized, substance. Likewise, we know very little concerning the relation of both substances to each other, either histologically or chemically.

In spite of this very judicious warning, a whole list of substances have been described and named in the nucleus on the basis of staining differences, which are often very slight. For example, Pappenheim⁸⁸ described nuclein, basiparachromatin, oxychromatin, basiplastin and oxyplastin. The last four substances belong together as plastin substances and are different from chromatin (basichromatin of Heidenhain).

Of all these nuclear constituents, the one which next to chromatin interests us the most is the so-called nucleolar substance. What is meant by "nucleolus"?

Häcker³⁶ explains the nucleolus as a structureless unorganized body. Flemming also considered the thing which we call nucleolus as an unimportant part of the nucleus morphologically. He considered it as a deposit of substances which are to be used in the metabolism of the nucleus and rebuilt. It is therefore certainly an important part of the cell physiologically, which is sufficiently proved by its almost universal presence, but not an important part of the cell organically, that is, morphologically.

Balbani⁶ goes a step further. He, also, believes that the nucleolus is a metabolic product. But he recognized that the formation of the nucleolus has a certain dependence on the intensity of the vegetative processes in the nucleus and cell.

Finally, M. Heidenhain tried to explain the origin of the nucleolus by the following chemical process

Nucleoalbumins, rich in albumin, are taken up by the nucleus and in some unknown way are converted into nucleoproteids. These albuminous nucleoproteids, by the splitting off of (basic) albumin, are converted into nucleoproteids rich in phosphorus, which are basichromatins. The split off (basic) albumin, if

not used for the formation of other nuclear constituents and does not pass out of the nucleus, is collected into the nucleolus.

I agree entirely with this noted cytologist as opposed to the recently promulgated theory of Jäger,⁵³ according to which the surface of the nucleus and nucleolus, the producer of Meiröwsky's pyronoid substance, is formed by a fat-like substance. Jäger supports Eugen Albrecht.

The nucleoli are usually entirely structureless. Still, usually (Montgomery) vacuoles are present in the large nucleoli (nerve cells, egg cells, glandular cells with large granules), and when they are numerous they can give a net like, thready structure to the nucleolus, which Heidenhain calls pseudo-structure.

Montgomery⁸⁰ divides the phenomena of nucleolar division into two kinds: (1) the nucleolus becomes longer and is broken up into two or more parts, which in turn are capable of division. (2) The nucleolus undergoes a breaking up into many granular parts. The author considers the second method as a degeneration.

That nucleoli are extruded from the resting nucleus has often been claimed and as often denied. Heidenhain⁴¹ saw such a process very exceptionally, when in a flat nucleus (nuclei of capillary walls and connective tissue) the nucleolus lies against the nuclear membrane, and the place of adhesion opens outward.

The possibility of such an extrusion has lately been demonstrated by Montgomery on an object that excludes all possibility of error.

It was a unicellular gland of *Piscicola rapax*. The process was inaugurated by an enormous growth of cell and nucleus. During the increase in growth of the nucleus, the originally simple nucleolus increases in size, becomes longer and irregular and finally breaks up into a large number of fragments, which subdivide, so that at the height of development as many as 300 nucleoli may be present. As soon as secretion starts, the nucleus begins to get smaller, and the nucleoli gradually pass out into the cell plasma. But the author thinks there is no direct connection with the formation of secretion bodies. Finally only one nucleolus remains in the very much diminished nucleus. The extruded nucleoli gradually lose their staining reaction, fuse with each other and finally disappear completely.

Of special interest is the statement of the author about the action of the nucleolus during cell division.

It was formerly supposed that during amitosis, the nucleolus divided by segmentation. Heidenham considers this division to be passive, since he considers it a lifeless body. This belief is supported by the fact that the action of the nucleolus during mitosis varies in unimportant manners.

During indirect division (mitosis) the general biologic character of the nucleolus as an unorganized substance fated to complete extrusion comes most plainly to the fore. In the different forms of cells, the following possibilities have been observed: (1) The nucleolus almost completely disappears in the prophase of mitosis while the nuclear membrane still persists; this is the usual condition. (2) If the nucleolus is unusually large or dense, it persists for some time after solution of the nuclear membrane and comes to lie in the plasma, where it is gradually absorbed; these nucleoli which escape from the nucleus and lie in the body of the cell are called by Häcker metanucleoli. (3) It sometimes happens that the metanucleolus, when it happens to have the appropriate position, passes over into the daughter star. (See Heidenham, l. c. p. 192.)

Usually the nucleolus disappears without leaving a trace during the earliest stage, from which it can be correctly deduced that it is no organ of importance to life.

Heidenham considers Wendt's claim that the nucleolar substance (in plants) participates in the formation of chromosomes as untenable.

An extension of our view concerning the importance of the individual parts of the nucleus has been brought about by the study of protozoa and promises in the future to be fruitful in the study of the metazoan cells.

In certain protozoa, two parts of the nucleus are found which serve different purposes in the life of the cell, which Schaudinn¹⁰² called the metabolic and the propagative nuclear substance. The investigations of this noted author were upon the chromidial network of certain rhizopods, which he regarded as divided reproductive nuclear substances. It did not escape his farseeing vision that thereby a new perspective was opened for the whole study of the cell, as was shown by his words, "It will be the labor of future investigators to examine the cells of higher organisms for the presence of these two

nuclear substances, which in certain protozoa are differentiated into metabolic and reproductive nuclear substances, and to determine their relations to each other."

From these investigations and from the related one of v. Prowazek⁶⁵ and Leger⁶⁶ on blood Flagellates and Gregarina, a general law can be drawn, which can be called the "Double Character of Animal Cells." According to Schaudinn and v. Prowazek, the nucleus of a resting Trypanosome or Herpetomonas consists of two combined nuclei which separate upon the conversion of the ookinete into the trypanosoma. One becomes the sexual nucleus, and the other the motile nucleus or blepharoblast. Weismann calls them the propagatory and the somatic nuclei.

The separation of the two nuclei is permanent in the trypanosomata and infusoria whose motile apparatus is highest developed.

Both have only a short stage where both nuclei are fused; it is immediately after fertilization. In both there immediately follows a division of the fertilized nucleus, which is nothing else than a separation into the propagatory and the somatic parts.

Schaudinn in his fundamental work on Trypanosoma claimed that this first division, which led to the formation of the motile nucleus, was a heteropoleic one and resulted in two nuclei of different characters.

The binuclear condition is plainly visible in the egg and sperm cells of Dytiscus, a metazoa. Otherwise, the complete separation of the two kinds of nuclei is very rare, in the metazoan cell. Wherever, according to Goldschmidt, it is present, e. g., in all kinds of functioning cells, as opposed to supporting and covering cells, the somatic nucleus appears in the form of a chromidial apparatus. Here is again a point of comparison for the explanation of similar processes in more highly organized metazoan cells.

The most difficult point is the distinguishing of the process when it takes place within the nucleus, so that the existence of two different kinds of chromatin must be assumed. Fortunately, Lubosch⁶⁷ recently accomplished this by showing the presence of idiochromatin and trophochromatin. He was led to it by his findings in the amphibian germinal vesicle. The nucleoli generations which, according to Carnoy's well known

investigations, especially appear here during the period of growth, are simply expressions of his trophochromatin. The somatic nucleus functionates during the trophic period of the cell without giving up its position within the amphinucleus. The same thing takes place when the trophic processes show distinct relations with a nucleolus, as, e. g., in the entoderm cells of the *Nassa* embryo, where, according to R. W. Hoffmann⁵⁰, the nucleolus contains the trophochromatin.

By far the most frequent way in which the existence of both forms of nuclei is shown is the temporary appearance of the somatic nuclear substance in the plasma in the form of chromidia.

Goldschmidt²⁹, on the grounds of these and other findings, in the literature as well as his own investigations on *Ascaris*, expresses his view in the following words, which I quote verbatim, on account of their importance:

"Every animal cell is binuclear, according to its nature: it contains a somatic and a propagatory nucleus. The former possesses the somatic functions, metabolism and movement, and may be predominately a metabolic or motile nucleus. The propagatory nucleus contains, above all, the inherited substance, which also possesses the power of forming a new metabolic nucleus. Both kinds of nuclei are usually combined in one nucleus, the amphinucleus. The separation can take place in a greater or less degree; a complete separation is rare, usually a separation into a nucleus preponderately propagatory, but still mixed nucleus, the nucleus in its usual sense, and into the chief mass of the somatic nucleus, the chromidial apparatus.

The complete separation of the two kinds of nuclei is found in only a few cases, in connection with reproduction in the protozoa, and in oogenesis and spermatogenesis in the metazoa.

In the tissue cells the separation may be entirely unnoticed as is the usual case in inactively functioning cells and completely formed egg cells. Within the nucleus, especially of the egg cell, it is visible by a distinction between two kinds of chromatin, the idiochromatin and the trophochromatin. The separation becomes distinct when portions of the somatic nucleus pass into the plasma, forming chromidia. In gland cells this appears at regular intervals; in egg cells during yolk formation. A nearly complete separation can be determined

in ganglion and muscle cells. The somatic nucleus lies in the plasma as the chromidial apparatus, but has the closest association with the preponderatingly propagatory nucleus, by which it is continually added to.

Cells with only propagatory nuclei, which however can form somatic ones, are found only in the gametes of protozoa and in certain cells of the ovary, possibly also in many kinds of spermatozoa.

Cells with only somatic nuclei are also possible; the rest bodies of the *Gregarina*, the diminished cells of *Ascaris*, certain muscle cells."

This double nature of the metazoan nucleus, stated in the above words of Goldschmidt, has been contradicted recently by Hartmann³⁵ on the grounds of numerous observation on protistan nuclei. According to this learned author, a real double nucleus is present only in the ciliates, some of the rhizopods and gregarins, and myxosporidians, as only here do whole nuclei degenerate as somatic nuclei. The macronucleus of the infusoria, which Goldschmidt uses as the basis of the extension of his theory of amphinucleus to the metazoan cell, is homologous with the nucleus of the metazoan cell itself and not with the chromidia of a body cell of a metazoan. This view Hartmann states in his first sentence, according to which we can speak of an amphinucleus only when by a polar division of the individualized centriol, be it either homopol or heteropol, two distinct nuclei are formed. This condition is found only in a few protozoa. The formation of vegetative chromidia is, on the other hand, a peculiarity which can be found in any cell which is in a high state of functioning and was recognized, for example, in the macronucleus of infusoria by Comes.

We will now leave this debated ground and turn to the question: What use can we make of these findings in our special investigation of the pigment genesis from the nucleus?

We must regard the migration of chromatin particles from the nucleus into the cytoplasm as a widespread property of animal cells under normal and pathologic conditions. Secondly, according to the results of investigations on the invertebrates, we are no longer compelled to lay stress on the question whether each case is one of migration of chromatin or merely the elimination of unnecessary nucleolar substance.

We have learned to use the unequal morphologic functional factor instead of the uncertain and empiric differentiation of portions of the nucleus on the grounds of staining peculiarities. We distinguish between the real chromatin, as the reproductive part of the nucleus, the idiochromatin on the one hand, and the other constituents of the nucleus, which consist of all stages of metabolism of the chromatin. With Lubosch⁶⁴ we call the latter trophochromatin. The nucleoli are included under the last general classification.

These findings and conclusions combined with R. Hertwig's law of nucleoplasma relation, is able to explain all the above described processes in the course of the mitosis of embryonal cells and tumor cells, as well as the extrusion of chromatin in its widest sense from the otherwise intact resting nucleus.

There remains only to say a few words about the significance of the finding that pigment formation accompanies the change of the whole nuclear substance, which in the light of the present cytopathology is called degenerative processes. I include here the origin of the pigment in the eye of vertebrates and the multiple methods of pigment formation in melanosarcoma, whereby the nucleus is completely degenerated.

Here we come to a point that is intimately connected with more than one problem. The question of the pigment genesis probably plays a subordinate role to that of the general importance which these processes have for the whole question of minute cellular pathology.

Many authors at present are working on the questions of specific cellular changes and cellular enclosures in infectious diseases, without proper knowledge of the multiple changes which the cell undergoes of itself, or under the influence of nonspecific external influences. In this connection, I would recall the extensive literature regarding the supposed causative agents of the vaccine diseases of the cornea, trachoma, the different malignant tumors, etc. There is no doubt that a knowledge of minute cellular pathology would guard us from many blunders. That these errors are very possible is well shown by numerous examples from the above quoted literature, which I would like to mention. But I refrain because I am soon to publish an article upon the disseminated signs of degeneration in embryos and their significance as developmental factors.

Finally, Reichenow⁹⁵ reported from his work on the intestine of *Anuria* concerning cellular degenerations which have some resemblance to the nuclear changes described by me. This author has shown no relation to pigment formation. The changes in the protoplasm appeared in the form of increasing vacuolization. The first signs of beginning depression of the nucleus appeared as a collecting of the previously finely divided chromatin threads, while the nucleolus disappeared.

In more advanced stages of the degeneration the characteristic nuclear structure becomes more and more obliterated. In place of network, a few thick bands traverse the nucleus, and finally these also disappear. The massed chromatin later assumes a globular form, which Reichenow regards as a sign of chemical retrometabolism transforming the living into a dead substance. These globular drops usually lie close against the nuclear membrane, which usually is well preserved.

These structures resemble those which Amann⁴ saw in uterine carcinoma and degenerating renal epithelium, and called "hyperchromatosis of the nuclear wall."

The degenerated cells, lying close to each other, according to Reichenow have a tendency to fuse. Structures are thus formed which he thinks cause the pathologist to make false interpretations, even to the extent of calling them causative agents—which has often occurred.

The detachment of small parts of the nucleus, as well as a division of the entire nucleus, into two or more parts is regarded by Reichenow as an attempt to overcome the beginning degeneration. The detached chromatin bodies seem to increase in size by absorption of fluid. In this way are formed bodies which bear an extraordinary resemblance to the Guarnier bodies found in vaccine.

It is now time to ask whether it is proper to correlate the normal pigmentary processes in the optic analgen of mammalian embryos with nuclear changes which in the light of our present knowledge of cytopathology we regard as degenerative ones. We must remember that the destruction of a number of cells in the analgen, for the benefit of those which survive, even when this process has the ordinary picture of degeneration, is not identical with a "degenerative process." On the contrary, it may be a case of transformation of nuclear matter, for the purpose of forming an increased active or productive state.

In an attempt to explain the last mentioned appearances, this question above all must be answered—Should we consider the nuclear changes following directly on the first described chromatin changes in a living, dividing cell as of a degenerative type, or is it a case of a process different in principle, which finally only by degeneration leads to the same end result, pigment formation?

I feel, on the grounds of my examination of a large embryologic material, that I may claim that there exists such a relation which is a progression, starting with the type of chromatin extrusion from the intact cell and ending in complete dissolution of the cell.

The theory of Hertwig concerning the "Nucleoplasmic relation" is entirely favorable to such a claim. The same impulse which in a moderate degree can cause a slight hypertrophy of the nucleus and a resulting formation of chromidia, when increased beyond a certain limit can cause an overthrow of all the natural regulative cellular processes resulting in a destruction of the entire cell.

With the discovery of the origin of the pigment from the nucleus, and the description of the individual phase of its development, the labor of the morphologist is ended. Now it is the task of the biochemist to instruct us as to chemical and fermentative processes going on in the pigment formation.

Notice must be taken of the fact shown by previous investigators, that in the pigmentation of animal cells it is not merely a question of absorption of substances floating in the blood, which are held back by certain forms of tissue and converted into pigment by specific cell ferments. The first step is the one here described, morphologic changes in the nucleus of the cell, followed secondarily by pigment formation.

Such a consideration of the autochthonous pigmentation of the animal cell is in no way opposed to the findings of the modern physiologico-chemists. If we admit that the chromatin particles described by us form the raw material for pigment, and are identical with the tryptophan or its intermediate forms of Eppinger²⁰, it follows that the chromatin particles formed under the influence of normal or pathologic processes are converted into pigment under the influence of the action of specific cell ferments, possibly tyrosinase.

So long as chromatin, the mother substance of pigment, is

found within the normal nuclear membrane, it is protected from the darkening influence of the cell ferment. This can exert its action on the chromatin threads only when the nuclear membrane disappears normally during mitosis, or when individual chromatin particles are eliminated during the period of rest, as described above. How well this applies to all cases of normal and pathologic pigmentation remains to be determined by further investigation.

SUMMARY.

(1) In every case colorless stromata, the so-called pigment carriers, are the basis of the black pigments of the eye and malignant tumors.

(2) The colorless pigment carriers are morphologically different from each other, according to the kind of animals and the place of their origin. But the form is typical for the particular place and exactly corresponds to the form of the first melanin particles to appear.

(3) The colorless pigment carriers of the metazoa are derived from the nucleus exclusively, in all the cases investigated by me. Their direct origin from the chromatin of the nucleus and their passage into the cytoplasm can be exactly traced. They stain easily and deeply with all nuclear stains and are comparable to the "chromidia" of Hertwig.

(4) The different actions of the nucleus in the formation of the colorless pigment carriers may be divided into two chief types. According to the present status of our knowledge of nuclear structure and nuclear death, they are the active or productive, and the degenerative types.

(5) The active or productive type is characterized by the nucleus extruding chromidial substance into the cytoplasm, while undergoing no noticeable injury to its vital functions. In this type the colorless pigment carriers arise in the pigment epithelium of the chick's retina in the resting period of the nuclear division. In this category belongs the widely disseminated extrusion of chromidial substance in the prophase of mitotic nuclear division in embryonal cells and tumors.

(6) The degenerative type involves a partial or complete destruction of the nucleus. Example of the complete destruction of the nucleus during the pigment development are the pigment epithelium of mammalian embryonic eyes, and the

different kinds of pigmentation of melanosarcomata, described in the text. A partial destruction of the nucleus with subsequent pigmentation is exemplified by the nuclear fragmentation in rapidly developing malignant tumors.

(7) The conversion of colorless pigment carriers into pigment probably takes place under the influence of specific cellular ferments. The latter can exert their action on the chromatin, the mother substance of the pigment, only when the nuclear membrane has normally temporarily disappeared during mitosis, or when single chromatin particles during the resting period are extruded from the nucleus, as described.

The findings described in this work are the results of investigations which extend over a number of years and which were carried out at different institutions. The first observations were made during the time I worked in the I. Anatomischen Institut in Budapest. They were continued in the Freiburg Anatomischen Institut and in the laboratory of the Universitäts-Augenklinik in Freiburg. I desire to express my thanks for their kind assistance to my honored teachers, Hofrat Prof. Dr. M. v. Lenhossék in Budapest and Geheimrat Prof. Dr. R. Wiedersheim and Geheimrat Prof. Dr. Th. Axenfeld in Freiburg i. Br.

LITERATURE.

1. Albrecht, Eugen: Über die Bedeutung myelinogener Substanzen im Zelleben. Deutsche pathol. Gesellsch., 1903.
2. Ibid.: Exper. Untersuchungen über die Kernmembran. Beitr. z. pathol. Anat., on the sixtieth birthday of Prof. Bollinger. Bergmann, Wiesbaden, 1903.
3. Ibid.: Zellular-Pathologie. Frankfurter Zeitschr. f. Path., Bd. I, S. I., 1907.
4. Amann: Über Kernstrukturen in Uteruscarcinomen. Verh. d. Deutsch. Gesellsch. f. Gynaekologie, VI, 1895.
5. Arnold, J.: Beitræge zur Entwicklungsgeschichte des Auges. Heidelberg, 1874.
6. Balbiani, E. G.: Sur la structure du noyau des cellules salivaires chez les larves de Chironomus. Zool. Anz., 1881.
7. Ballowitz, E.: Über das Epithel der Membrana elastica posterior des Auges, seine Kerne und eine merkwürdige Struktur seiner grossen Zellsphaeren. Arch. f. mikr. Anat., Bd. 65, S. 230-290, 1900.
8. Benda, C.: Neuere Mitteilungen über die Histogenese der Säugetierspermatozoen. Verh. physiol. Gesellsch., Berlin, 1897.
9. Ibid.: Über die Spermatogenese der Vertebraten und höheren Evertebraten. Verh. physiol. Gesellsch., Berlin, 1893.
10. Ibid.: Die Mitochondria. In: Markel-Bonnet, Ergebnisse der Anatomie und Entwicklungsgeschichte, Bd. XII, S. 743-766, 1902 (1903).
11. Bertrand: Sur une nouvelle oxydase ou ferment soluble oxydant d'origine végétale. Compt. rend., 122, 1215, 1896.

12. Blockmann, F.: Über eine Metamorphose der Kerne in den Ovarialeiern und den Beginn der Blastodermbildung bei den Ameisen. Verh. naturh.-med. Verein, Heidelberg, 1884.
13. Borgert, A.: Untersuchungen über die Fortpflanzung der tripyleen Radiolarien, speziell von *Aulacantha scolymantha*. 2. Teil. Arch. f. Protistenkunde, Bd. 14, 1909.
14. Brandts, Eugen: Über Einschlüsse im Kern der Leberzelle und ihre Beziehungen zur Pigmentbildung. (a) beim Hund, (b) beim Menschen. Ziegler's Beiträge, Bd. 45, S. 457-475, 1919.
15. Calkins, G. N.: Observations on the yolk nucleus in the egg of *Lumbricus*. Trans. New York Acad. Sc., 1895.
16. Dalla Favera, G. B.: Ein Beitrag zur Kenntnis der Pigmentnaevi. Ziegler's Beitr. z. pathol. Anat. u. z. allgem. Path., Bd. 43, S. 43-88, 1908.
17. Distaso: Die Beziehung zwischen den Pigmentbaendern des Mantels und denen der Schale bei *Helix nemoralis* L. und *hortensis* Müller. Biol. Zentralbl., 28, 1908.
18. Ehrmann, S.: Zur Kenntnis von der Entwicklung und Wandern des Pigmentes bei den Amphibien. Arch. f. Dermatologie und Syphilis, Bd. 24, 1892.
19. Ibid.: Das melanotische Pigment und die pigmentbildenden Zellen der Menschen und der Wirbeltiere in ihrer Entwicklung nebst Bemerkungen über Blutbildung und Haarwechsel. Bibliotheca medica, Bd. 2, H. 6, Cassel, 1896.
20. Eppinger, H.: Über Melanurie. Biochemische Zeitschr., Bd. 28, H. 3-4, 1910.
21. Fischel, A.: Über Beeinflussung und Entwicklung des Pigments. Arch. f. mikr. Anat., Bd. 47, 1896.
22. Ibid.: Zur Pigmententwicklung. Anat. Anz., Bd. 12, Nr. 22, S. 526, 1896.
23. Fürst, M. C.: Ringe, Ringreihen, Faeden und Knaeuel in den Kopf- und Spinalganglienzellen beim Lachse. Anat. Hefte, Bd. XIX, H. 62, S. 378-420, 1902.
24. v. Fürth, O.: Tierische Farbstoffe. V. Melanine und sonstige Farbstoffe. Handbuch der Biochemie des Menschen und der Tiere, Bd. 1, S. 743-755. G. Fischer, Jena, 1909.
25. Galeotti: Über die Granulationen in den Zellen. Internat. Monatsschrift. f. Anat. u. Physiol., Bd. 12, 1895.
26. Gaule: Über Würmchen, welche aus Froschblutkörperchen auswandern. Arch. Anat. Physiol., 1880.
27. Ibid.: Die Beziehungen der Cytozoen zu den Zellkernen. Ibid., 1881a.
28. Ibid.: Kerne, Nebenkerne und Cytozoen. Zentralbl. med. Wiss., 1881b.
29. Goldschmidt, Richard: Der Chromidialapparat lebhaft funktionierender Gewebszellen. Histologische Untersuchungen an Nematoden II. Zoologische Jahrbücher, Abt. für Anatomie und Ontogenie der Tiere, Bd. 21, H. I, S. 41-134, T. 3-8, 1904.
30. Goldschmidt, R., und Popoff, W.: Die Karyokinese der Protozoen und der Chromidialapparat der Protozoen- und Metazoenzelle. Arch. f. Protistenkunde, Bd. 8, 1907.
31. Golgi, C.: Appunti intorno alla struttura delle cellule nervose. Rendic. Ist. Lombard. Sc. Lett., 1898.
32. Gruber, A.: Untersuchungen über einige Protozoen. Zeitschr. f. wiss. Zool., Bd. 38, 1883.
33. Ibid.: Über die Einflusslosigkeit des Kerns auf die Bewegung, die Ernährung und das Wachstum einzelner Tiere. Biol. Zentralbl., III. Bd., 1. Dez., 1883.

34. Ibid.: Über Künstliche Teilung der Infusorien. Biol. Zentralbl., IV. Bd., 1. February, 1885.
35. Ibid.: Zweite Mitteilung darüber. Ebenda, V. Bd., I. Mai, 1885.
36. Haecker, V.: Praxis und Theorie der Zellen- und Befruchtungslehre, Jena, 1899.
37. v. Hansemann, David: über pathologische Mitosen. Virchow's Arch., Bd. 123, S. 356, 1891.
38. Hartmann, M.: Die Konstitution der Protistenkerne und ihre Bedeutung für die Zellenlehre. Jena, 1911.
39. Heidenhain, R.: Beiträge zur Lehre von der Speichelabsonderung. Stud. physiol. Institut. Breslau, H. 4, 1868.
40. Heidenhain, M.: Über die Zentralkapseln und Pseudochromosomen in den Samenzellen von Proteus, sowie über ihr Verhältniss zu den Idiozomen, Chondromiten und Archiplasmaschleifen. Anat. Anz., Bd. 18, S. 513-550, 1900.
41. Ibid.: Plasma und Zelle. Erste Lieferung in: Handbuch der Anatomie des Menschen, by K. v. Bardeleben. Jena, 1907. Zweite Lieferung in: Handbuch der Anatomie des Menschen by K. v. Bardeleben. Jena, 1911.
42. Hensen, F.: Zur Struktur der Eizellen gewisser Crustaceen und Arthropoden. Anat. Anz., Bd. 37, 1903.
43. Hertwig, O.: Allgemeine Biologie., III. Auflage. Jena, 1909.
44. Ibid.: Der Kampf um Kernfragen der Entwicklungs- und Vererbungslehre. G. Fischer, Jena, 1909.
45. Hertwig, R.: Über Kernteilung, Richtungskörperbildung und Befruchtung bei Actinosphaerium eichhorni. Abh. bayr. Akad. Wiss., 1898.
46. Ibid.: Die Protozoen und die Zelltheorie. Arch. Protistenkunde, 1902.
47. Ibid.: über das Wechselverhaeltnis von Kern und Protoplasma, München, 1903.
48. Ibid.: über Korrelation von Zell- und Kerngrösse und ihre Bedeutung für die geschlechtliche Differenzierung und die Teilung der Zelle. Biol. Zentralbl., 1903.
49. Ibid.: über physiologische Degeneration bei Actinosphaerium eichhorni. Festschr. E. Haeckel. Jena, 1904.
50. Hoffmann, R. W.: über die Ernährung der Embryonen von Nassa mutabilis. Zeitschr. f. wiss. Zool., 1892.
51. Holmgren, E.: Neue Beiträge zur Morphologie der Zelle. In: Merkel-Bonnet, Ergebnisse der Anatomie und Entwicklungsgesch., Bd. XI, S. 274-328, 1901-1902.
52. Jaeger, Alfred: Die Entstehung des Melaninfarbstoffs. Virchow's Arch., Bd. 198, H. I., S. 62, 1909.
53. Ibid.: Die Melanosarkomatose der Schimmelpferde. Virchow's Arch., Bd. 198, H. I., S. 1, 1909.
54. Ibid.: Erwiderung auf Herrn Meiwowskys vorstehende Mitteilung: "Kritisches zur Melaningenese." Virchow's Arch., Bd. 199, H. 3, S. 567, 1910.
55. Jarisch: Zur Anatomie und Herkunft des Oberhaut- und Haarpigmentes. Arch. f. Dermat. u. Syphilis, 23. Jahrg., 1891.
56. Ibid.: über Anatomie und Entwicklung des Oberhautpigments beim Frosche. Arch. f. Dermat. u. Syphilis, 24. Jahrg., 1892.
57. Ibid.: über die Bildung des Pigments in den Oberhautzellen. Arch. f. Dermat. u. Syphilis, 24. Jahrg., 1892.
58. Kessler, L.: Zur Entwicklung des Auges der Wirbeltiere. Leipzig, 1877.

59. Kölliker, A.: Entwicklungsgeschichte des Menschen und der höheren Tiere. I. Auflage, 1861.

60. Ibid.: Über die Entstehung des Pigmentes in den Oberhautgebilden. Zeitschr. f. wiss. Zool., Bd. 45, H. 4, 1897.

61. Kopsch, F.: Die Darstellung des Binnennetzes in spinalen Ganglienzellen und anderen Körperzellen mittels Osmiumsäure. Sitzungsber. Akad. Wiss., Berlin, 1902.

62. Kruckmann: Ein Beitrag über die Pigmentepithelzellen der Retina. v. Graefe's Arch. f. Ophth., Bd. 57 und 58, 1895.

63. Ibid.: Über Pigmentierung und Wucherung der Netzhaut-neuroglia. v. Graefe's Arch. f. Ophth., Bd. 60, 1905.

64. Kühne, W. und Lea, Sh.: Über die Absonderung des Pankreas. Verh. d. naturh. med. Ver., Heidelberg, 1876.

65. Laguesse, E.: Corpuscules paranucléaires (parasomes), filaments basaux et zymogènes dans les cellules sécrétantes. Cinquant. Soc. Biol., Paris, 1899.

66. Léger L.: La reproduction sexuée chez les Stylorhynchus. Arch. f. Protistenkunde, 1904.

67. Labosch W.: Über die Nukleolarsubstanz des reifenden Tritoneies, etc. Habilitationsschrift, Jena, 1902.

68. Lukjanow: Grundzüge einer allgemeinen Pathologie der Zelle. Leipzig, 1891.

69. Marengli, S.: Alcune particolarità di struttura e di innervazione della cute dell' *Ammocoetes branchialis*. Zeitschr. wiss. Zool., 1903.

70. Mathews, A. M.: The Changes in Structure of the Pancreas Cell. Journ. Morphol., Vol. 15, Suppl., 1899.

71. Mertsching, A.: Beiträge zur Histologie des Haares und Haarbalges. Arch. f. mikr., Bd. 31, S. 32-53, 1888.

72. Ibid.: Histologische Studien über Keratohyalin und Pigment. Virchow's Arch., Bd. 116, 1889.

73. Meirowsky, E.: Die Entstehung des Oberhautpigmentes in der Oberhaut selbst. 1. Beitrag zur Pigmentfrage. Monatshefte f. prakt. Dermat., Bd. 42, 1906.

74. Ibid.: Die Entstehung des Oberhautpigmentes aus der Substanz der Kernkörperchen. 2. Beitrag zur Pigmentfrage. Monatshefte f. prakt. Dermat., Bd. 43, 1906.

75. Ibid.: Besitzt das atrophische Narbenepithel des Weissen die Fähigkeit zur Pigmentbildung. 3. Beitrag zur Pigmentfrage. Monatshefte f. prakt. Dermat., Bd. 43, 1906.

76. Ibid.: Über den Ursprung des melanotischen Pigments der Haut und des Auges. Klinkhardt, 1910.

77. Ibid.: Kritisches zur Melaningenese. Virchow's Arch., Bd. 199, H. 3, S. 561, 1910.

78. Meves, F.: Über den von La Valette St. George entdeckten Nebenkern (Mitochondrienkörper) der Samenzellen. Arch. f. mikr. Anat., Bd. 56, S. 553-605, 1900.

79. Ibid.: Struktur und Histogenese der Spermien. In: Merkel-Bonnet, Ergebnisse der Anatomie und Entwicklungsgeschichte, Bd. XI, S. 437-516, 1901-1902.

80. Montgomery, Thos. H.: Comparative Cytological Studies with Especial Regard to the Morphology of the Nucleus. Journ. of Morphology, Vol. 15, 1898.

81. Negri: Di una fine particolarità di struttura delle cellule di alcune ghiandole dei mammiferi. Bull. Soc. med. chir., Pavia, 1899.

82. Neumann, E.: Beiträge zur Kenntnis des pathologischen Pigmentes. Virchow's Arch., Bd. 3, 1888.

83. Neuberg, C.: Zur chemischen Kenntniss der Melanome. *Virchow's Arch.*, Bd. 192, H. 3, 1908.
84. Nussbaum, M.: Über den Bau und die Taetigkeit der Drüsen. 3. Mitt. *Arch. f. mikr. Anat.*, Bd. 13, 15, 16, 1877-1879.
85. *Ibid.*: über die Teilbarkeit der lebendigen Materie. *Arch. f. mikr. Anat.*, Bd. 26, 1885.
86. *Ibid.*: Entwicklungsgeschichte des menschlichen Auges. Graefe-Samisch, *Handb. d. ges. Augenheilk.*, 2. Auflage, 1899.
87. Ogata, M.: Die Veraenderung der Pankreaszellen bei der Secretion. *Arch. Anat. Physiol.*, 1883.
88. Pappenheim, A.: Bemerkungen zur Kenntniss und Bedeutung der basophilen Punktierung (Körnclung) der roten Blutkörperchen. *Folia Haemat.*, 5. Bd., No. 6, 1908.
89. Pensa: Supra una fine particularita di struttura di alcune cellule delle capsule soprarrenali. *Bull. Soc. med. chir. Pavia*, 1899.
90. Pianese, G.: Beitrag zur Histologie und Aetiologie des Carcinoms. *Histologische und experimentelle Untersuchungen. Erstes Supplementheft der Beitrage zur pathol. Anat. und zur allgem. Pathol.*, by Prof. Dr. E. Ziegler. G. Fischer, Jena, 1896.
91. Platner, G.: über die Entstehung des Nebenkerns und seine Beziehung zur Kernteilung. *Arch. f. mikr. Anat.*, Bd. 26, S. 343-369, 1886.
92. Platner, G.: Beitrage zur Kenntniss der Zelle und ihrer Teilungserscheinungen. *Arch. f. mikr. Anat.*, Bd. 33, S. 125 to 152 and 189 to 215, 1889.
93. v. Prowazek, S.: Die Entwicklung von *Herpetomonas*. *Arb. a. d. Kais. Gesundheitsamte*, Bd. 31, 1904.
94. Rabl, C.: Über den Bau und die Entwicklung der Linse. *Zeitschr. f. wiss. Zool.*, Bd. 63, 65 und 67. Leipzig, 1900.
95. *Ibid.*: über "Organbildende Substanzen" und ihre Bedeutung für die Vererbung. (Antrittsvorlesung in Leipzig.) Leipzig, 1906.
96. Reichenow, E.: Die Rückbildungserscheinungen am Anurendarm während der Metamorphose und ihre Bedeutung für die Zellforschung. *Arch. f. mikr. Anat.*, Bd. 72, S. 671-718, 1908.
97. Reinke, F.: Zellstudien. C. über Pigment, seine Entstehung und Bedeutung. *Arch. f. mikr. Anat.*, Bd. 43, S. 377-422, 1894.
98. Remak, R.: Untersuchungen über die Entwicklung der Wirbeltiere. Berlin, 1855.
99. Rössle, R.: Der Pigmentierungsvorgang im Melanosarkom. *Zeitschr. f. Krebsforsch.*, Bd. 2, S. 291, 1904.
100. Rohde, E.: Untersuchungen über den Bau der Zelle I. und III. *Zeitschr. f. wiss. Zool.*, 1903, 1904.
101. Schaudinn, F.: Untersuchungen über die Fortpflanzung einiger Rhizopoden. *Arb. a. d. Kais. Gesundheitsamt*, 1903.
102. *Ibid.*: Generations- und Wirtswechsel bei *Trypanosoma* und *Spirochaete*. *Arb. a. d. Kais. Gesundheitsamt*, 1904.
103. Scherl: Einige Untersuchungen über das Pigment des Auges. v. Graefe's *Arch. f. Ophth.*, Bd. 39, 1893.
104. Schmidt, M. B.: Über die Verwandtschaft der haematoenen und autochthonen Pigmente und deren Stellung zu sog. Haemosiderinen. *Virchow's Arch.*, Bd. 115, 1889.
105. *Ibid.*: Haemorrhagie und Pigmentbildung. *Ergebnisse der allgem. Pathologie*, by Lubarsch-Ostertag. Abt. 2, 1895, und 3. Jahrg., 1896.
106. *Ibid.*: Über das Haemosiderin und Melanin. *Virchow's Arch.*, Bd. 163, 1900.

107. Seefelder, R.: Beiträge zur Histogenese und Histologie der Netzhaut, des Pigmentepithels und der Sehnerven. (Nach Untersuchungen am Menschen.) v. Graefe's Arch. f. Ophth., Bd. 73, H. 3, 1910.

108. v. Szily, A.: Histogenetische Untersuchungen. Anatomische Hefte, Bd. 33, H. 2, S. 227-314, 1907.

109. Ibid.: Über das Entstehen eines fibrillären Stützgewebes im Embryo und dessen Verhältniss zur Glaskörperfrage. Anatomische Hefte, Bd. 35, H. 3, S. 651-757, 1908.

110. Veratti, E.: Ricerche sulla fine struttura della fibra muscolare striata. Mem. Ist. Lombard, 1902.

111. Verworn, M.: Biologische Protistenstudien. Zeitschr. f. wiss. Zool., Bd. 46, 1888.

112. Wagner, K.: Die Herkunft des Eipigmentes der Amphibien. Zool. Anz., Bd. 35, No. 17, 1910.

113. Wieting und Hamdi: Über die physiologische und pathologische Melaninpigmentierung und den epithelialen Ursprung der Melanoblastome. Ein primäres Melanoblastom der Gellenblase. Ziegler's Beiträge zur pathol. Anat. und zur allgem. Pathol., Bd. 42, S. 23-84, 1907.

114. Wolfrum, M.: Der Naevus der Bindehaut des Augapfels und der Aderhaut und seine Beziehungen zu den melanotischen Tumoren. Ein Beitrag zu der Lehre von der Geschwülstentwicklung am Auge. v. Graefe's Arch. f. Ophth., Bd. 71, S. 195-282, 1909.

X.

A NEW HYPOPHYSIAL SYNDROME—
HYPOPHYSIAL NANISM.

R. BURNIER, M. D.,

PARIS.

Translated by M. W. FREDERICK, M. D.,

SAN FRANCISCO.

Through the works of P. Marie, Fröhlich¹, and Bartels², we have become acquainted with a number of syndromes which indicate a lesion of the pituitary body. It is almost universally admitted today that acromegaly is due to an excessive functioning of the anterior lobe of the hypophysis, while the diminution of function in the posterior lobe probably gives rise to an adiposogenital degeneration. (Fischer³, Cushing⁵.)

It is also a known fact that in giants, lesions of the hypophysis are not rare, and Brissaud and H. Meige believe that gigantism and acromegaly are one and the same hypophysial disease: gigantism is acromegaly during the period of growth, and acromegaly is gigantism when the growth of the body has ceased.

There are, however, some little known troubles during the period of growth of persons afflicted with pituitary lesions, which manifest themselves as arrested development of the skeleton. It is to this "Hypophysial Nanism" that I wish to call your attention. This nanism (dwarfing) which is apparently due to a decreased functioning of the anterior lobe, seems to take place in those cases in which the hypophysial troubles appear early in life, in infancy.

This fact has been proved by experiments. Aschner⁶, Gemelli, and Fichera showed that removing the pituitary body in young animals gave rise to a certain degree of nanism and infantilism. Aschner removed the hypophysis in fifty-two dogs; one-fourth of the animals died in the first eight days; eight dogs lived four to six weeks; five dogs lived more than

two months, and one dog lived nine months. The gland was removed by the buccal route, and the infundibulum was carefully respected in all cases. In the animals which survived, the main feature observed was an absolute arrest of development from the very moment of the operation. The epiphysial

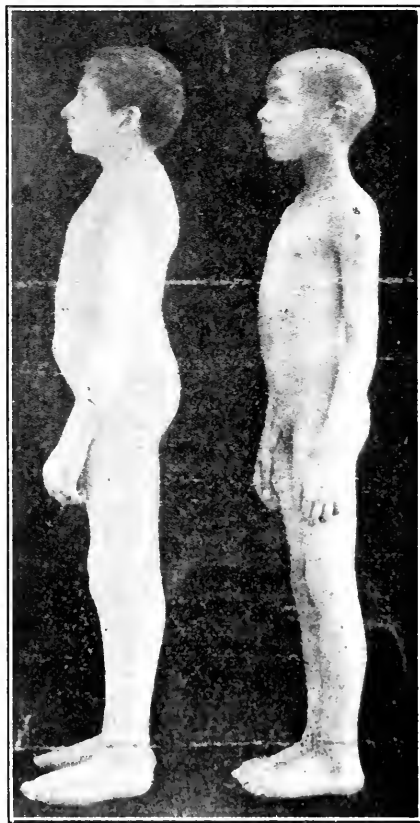


FIGURE 1.

To the right of the patient is a normal boy of eight years.

cartilages persisted, the genital organs remained infantile: the whole body presented a certain adiposity and retained the infantile aspect.

Aschner found that ablation of the pituitary body in adult animals had a depressive effect on the genital glands (azoo-

spermia, involution of the ovarian follicles). On the other hand, it has been shown by Exner that implantation of pituitary gland cause an increase in body height.

The hypophysis plays, therefore, an important part in the growth of the skeleton. These experimental data have been confirmed by clinical findings. I have observed a case of tumor of the hypophysis of early origin in a subject presenting a picture of arrested development of the skeleton.

L. is 26 years old, but looks like a child. (Fig. 1.) His height is 1 meter 25 centimeters (4 feet $1\frac{1}{4}$ inches), and his weight 32.5 kilograms ($71\frac{1}{2}$ lbs.). His family history offers nothing worthy of note. His father was killed in an accident; he was 1.75 meters tall. His mother, of medium height, is 63 years old. She has had six pregnancies, five of her children being girls, and the sixth one the patient. No miscarriages. One daughter died, but the other four are alive, and of rather more than medium height (1.70 meters).

During infancy, the patient was never sick. Until the age of 10 he developed normally, when all growth ceased. Raised in the country, he went to the primary school for three years. He learned to read and write with difficulty, and was then put to tending cattle until the age of 18. At that time he came to Paris. His height at that time was 1.17 meters. In five years he grew 8 centimeters, attaining his present height of 1.25 meters.

The 6th of May, 1904, he came to the eye clinic of the Lariboisière to have a foreign body removed from the right conjunctival sac. He stated at that time that the sight of the right eye had been lost since he was 8 years old. Dr. Morax, on examining him, found: Pupils of equal size. The left pupil reacts normally; the right pupil is insensitive to direct illumination, but the consensual reaction is normal. The vision of the right eye=0. The disc presents a picture of complete atrophic discoloration. The vision of the left eye = $\frac{5}{7}$; the field of vision is normal, and the fundus shows nothing pathologic.*

Since the month of April, 1910, the patient has noticed a diminution in the vision of the left eye. At the examination in February, 1911, the following was found: Pupils equal;

*This case was shown before the Société d'Ophtalmologie of Paris on April 4, 1911.

the right pupil does not react to light: reaction of left pupil present. Marked atrophic discoloration of both optic discs, without other pathologic changes. Vision of right eye = 0, of left eye, 1/50. Field of vision much reduced, the greatest reduction being in the temporal side of the field. (Fig. 2.)

On general examination the patient seems fairly well proportioned. (Fig. 3.) Nevertheless there is a certain disparity between the well developed thorax and the somewhat frail limbs. The head seems sunken in the shoulders. No stigmata of rachitis are present. The skin is normal, but rather cold to the touch, and does not give one the impression of myxedema. The wrinkles in the forehead are quite deep, giving the patient a senile look. The subcutaneous fat is abundant on thorax and abdomen, but it is regularly distributed, and no cushions of fat are to be found. The fat is wanting on the limbs.

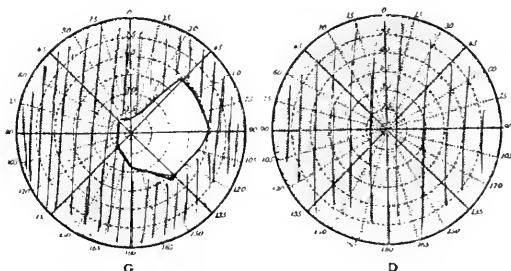


FIGURE 2.

The hair of the head is long and stiff: the eyebrows are normal, the eyelashes rather thin towards the outer canthi. On the rest of the body the hairs are entirely absent (face, axillae, pubis). (Fig. 3.)

The skull is round and well shaped. The skin is pale and sallow, the facies lunar. The physiognomy is senile. There is no exophthalmus, strabismus, or nystagmus. The senses of hearing, taste, and smell are normal. The teeth are regular, and well implanted. The palatine arch is moderately pointed. The tongue is normal. The voice is shrill and childish.

The neck is very short, and the head seems to sit on the shoulders. The thyroid gland can be made out, especially the left lobe, but it is fibrous and markedly atrophic. No cervical

adenitis is present. The thorax is well developed, but the sternum is not prominent. The mammary region is prominent and well supplied with fat.

Auscultation of heart and lungs reveal nothing particular.

The abdomen is the seat of abundant fat. Constipation is frequent.



FIGURE 3.

The external genital organs are rudimentary. The pubis is bald. The testicles have not descended; impotence is absolute.

The limbs, although well shaped, are frail and poorly supplied with muscles. The hands and feet, however, are over-

developed, and are thick and edematous. The skin is dry and wrinkled. The nails are furrowed and show trophic changes. The hands do not tremble, but adiadokokinesis is present. The stereodiagnostic sense is preserved. The tibia is normal, the patellary and Achilles tendon reflexes are normal; no Babinski. No trouble while standing erect or walking.

Urine is normal; no sugar or albumin. There is a slight polyuria (2,500 in twenty-four hours). Nothing abnormal revealed by the examination of the blood. Temperature is

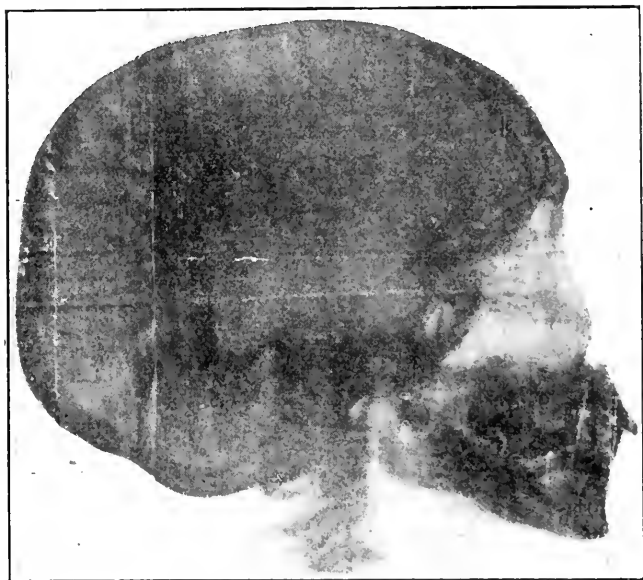


FIGURE 4.

normal, pulse rate 60. The cuticular reaction is negative, Wassermann weakly positive.

The radiograph of the skull shows the bones to be of normal thickness; no exostoses. The frontal sinus is normal, but the sella turcica is noticeably enlarged. (Fig. 4.)

The skeleton of the hand shows a persistence of the epiphysial cartilages in the metacarpus and the ulnoradial joint. (Fig. 5.)

Subjectively the patient has no complaints as to perverse

sensations of pain in his limbs. On the other hand, he complains of a frontal headache which has been almost constant since his childhood; there are intervals of freedom from headache, but there is always a feeling of heaviness in the head. This headache often exacerbates after eating, and is sometimes accompanied by nausea and vomiting. At times there is a whistling in the ears, but there is never any vertigo. The patient sleeps well at night, but has no inclination to fall asleep during the day.



FIGURE 5.

Intellectually the patient is infantile. His education has been very limited. He may be said to vegetate rather than to live. During the day he sits by the side of his bed, or walks in the garden, drinks, eats and sleeps. Reading is not easy on account of his lowered vision.

The patient has undergone specific treatment several times (injections of benzoate of mercury), and has also been subjected to opotherapy (thyroidin, orchitin, hypophysin). The vision seems to have been somewhat benefited (vision =

3/50, instead of 1/50), but the reduction in the field of vision remains, as does the general infantile aspect.

To recapitulate: We have a patient of 26, 1.25 meters tall, presenting all the clinical signs of a tumor of the hypophysis (bilateral atrophy of the optic disc, temporal hemianopsia, headache, vomiting, enlargement of the sella turcica). The tumor in question has developed very slowly, and dates from infancy. This is proved by the blindness of the right eye, which began at the age of 8. At this early age the tumor had already attained a size sufficient to cause compression of the optic nerve and resultant blindness of the right eye. The patient volunteers the statement that he ceased growing at the age of 10; he is at present a dwarf, in whom the juxto-epiphysial cartilages still persist.

We have before us, therefore, a typical case of "Hypophysial Nanism." Analogous cases are rare in literature, and none of the authors has pointed out the relation existing between the infantilism and the dwarfing of the patient with the epiphysial lesions.

Jutaka Kon⁷ reports an almost identical case. The man was 37 years old, 1.27 meters tall, and weighed 25 kilograms. Subcutaneous fat abundant, atrophy of external and internal genital organs, absence of hair in axillæ and on pubis. Even as a child he could not attend school on account of poor sight, showing that the tumor was present at this early age. The time at which growth ceased could not be determined. The autopsy revealed a slight hypoplasia of the thyroid, and a calcified tumor of the infundibulum with compression of the hypophysis. The microscope showed this tumor to be a teratoma in the sense of Askanazy; i. e., a tumor made up of a mixture of tissues originating from the three layers of the blastoderm.

Benda⁸ has also seen a teratoma of the hypophysial region in a dwarf of 38. The tumor was as large as a hazel nut, deeply embedded in the sella turcica, and compressed the hypophysis strongly. Hutchinson⁹ also found atrophy of the hypophysis caused by a fibroma in a dwarf. Hueter¹⁰ saw a female dwarf of 42, 1.06 meters high, and well proportioned, in whom two-thirds or three-fourths of the hypophysis was destroyed by a tuberculous process. The other glands, thyroid and suprarenals, were small but otherwise normal. The ovaries

were relatively large and well developed, but the patient had never menstruated.

In Bartel's² case the patient of 21 had developed normally until the age of 14, when growth had ceased. Adiposity was marked, the feminine type accentuated, genital atrophy and cryptorchismus of the right side were present. There was also concentric narrowing of the visual fields with amblyopia, and later blindness due to optic atrophy. At the autopsy a Malpighian epithelioma the size of a hen's egg was found occupying the hypophysial region. Nazari¹¹ relates the history of a man of 20, whose growth had stopped at the age of 7, until which time it had been normal. The arrest of growth coincided with the onset of epileptiform seizures, coming closely together. The patient, whose height was 1.25 meters, had the appearance of a boy of 10. No stigmata of rachitis. At the autopsy a tumor the size of a large nut and filled with a liquid rich in cholesterin was found occupying the enlarged sella turcica and compressing the olfactory and temporal lobes. The testicles were small and infantile, the thyroid normal, and the thymus persistent.

At the autopsy of a woman of infantile aspect and marked adiposity, Zöllner¹² found a carcinoma of the anterior lobe of the hypophysis. Mixer and Quackenboss¹³ found in a man of 27 who looked like a boy of 18, and showed genital atrophy, absence of axillary and pubic hair, visual troubles (bitemporal hemianopsia, white optic atrophy), and enlargement of the sella turcica, a congenital epithelioma of the hypophysis with cystic degeneration.

Uhthoff¹⁴ reports the history of a small (1.43 meters) woman, with manifest arrested development. Marked development of the panniculus adiposus. No goiter. Bilateral temporal hemianopsia, atrophic pallor of both discs, enlargement of the sella turcica. At the autopsy an adenoma of the hypophysis weighing 150 grams was found. The thyroid was small, 20 grams, and genital atrophy was present.

In other cases we have the clinical pictures only, as in my own case. Cross¹⁵ saw a woman of 22, height 1.22 meters, adiposity very marked, absence of hair, genital atrophy, but normal as to the eyes. The author thinks it a case of insufficiency of the anterior lobe of the hypophysis.

E. Levi¹⁶ reports the findings in the case of a woman of

20½, who gave one the impression of a girl of 10. Height 1.33, weight 28 kilograms, no development of breasts or hair. The genital organs were infantile, the thyroid could be easily palpated. Bilateral white atrophy of the optic discs. The sella turcica was enlarged. No doubt we have here either a tumor of the hypophysis, or a tumor of that region compressing the hypophysis.

Kümmell¹⁷ tells us of a man of 23 who looked like 14. Had been denied admission to the military service on account of his size. Genital atrophy and absence of hair, but no adiposity. Simple optic atrophy was present, and bitemporal hemianopsia for colors, later also for form. The contrast between his general infantile aspect and his senile facial expression was marked. Headache, vertigo and somnolence were also recorded, and death took place in semicoma.

Lemann and Wart¹⁸ observed a woman of 24, intelligent, of infantile aspect, height 5 feet 2 inches, who had never menstruated. Pubic and axillary hair were absent, the thyroid was not palpable. Bitemporal hemianopsia for colors only. The pulse rate was 116, and the arterial tension was low. The radiogram showed enlargement of the sella turcica and delayed ossification in the epiphysis of the long bones.

These are the different pictures which we can classify as "Hypophysial Nanism." Without doubt there are hybrid cases in which the nanism and the infantilism are dependent not alone on the hypophysial lesions but also on testicular, thyroïdal, and other lesions, as a sequence of the synergia of the glands with internal secretion. The syndrome is no longer uniglandular, but has become pluriglandular. In my case, however, the symptoms seem to be the result of a primary hypopituitarism.

Besides, as Sainton has well shown, we may meet alterations of increased and decreased function of the same gland. In my case there seems to have been a temporary hyperactivity of the hypophysis, inasmuch as at the age of 18 he suddenly began to grow again, and acquired an increase of 8 centimeters in five years, when his growth was again arrested. Another striking feature is the disproportion between the large hands and feet and the rest of the body. Having shown this alteration between increased and decreased function, it would not surprise me if he later on became an acromegalic.

As to the real cause of these pituitary lesions we are yet in the dark. In the cases of Hueter and Nazari the etiology was tuberculosis. Syphilis, the dystrophic par excellence, might be thought of, as in my case, where the Wassermann was positive.

BIBLIOGRAPHY.

1. Fröhlich. Ein Fall von Tumor der Hypophysis cerebris ohne Akromegalie. Wien. klin. Rundschau, 1901, Nos. 47-48.
2. Bartels. Ueber Plattenepithelgeschwülste der Hypophysengegend des Infundibulums. Zeitschr. f. Augenheilk., 1906, p. 407 et 530.
3. Launois et Cléret. Le syndrome hypophysaire adiposo-génital. Gaz. Hop., 13 et 18 Janvier, 1910.
4. B. Fischer. Die Beziehungen des Hypophysentumors zu Akromegalie und Fettsucht. Frankfurter Zeitsch. für Path., Bd. V, 1910, p. 351.
5. Goetsch, H. Cushing et C. Jacobson. Carbohydrate tolerance and the posterior lobe of the hypophysis. Johns Hopkins Hosp. Bull., vol. XVII, No. 243, June, 1911.
6. Aschner. Ueber die Folgeerscheinungen nach Exstirpation der Hypophyse. XXXIX Kongress der Deutschen Gesellsch. f. Chir., 1910.
7. Jutaka Kon. Hypophysenstudien. Ziegler's Beiträege zur path. Anatomie und zur allgem. Pathol., 1908, Bd. XLIV, p. 233.
8. Benda. Beit. zur normal. und path. Histolog. der Mensch. Hypophysis cerebri. Berl. klin. Woch., 1900, No. 52, p. 1205.
9. Hutchinson. Cited by Benda.
10. Hueter. Hypophysistuberculose bei eine Zwergin. Virchow's Archiv., 1905, Bd. CLXXXII, p. 219.
11. A. Nazari. Contrib. allo studio anat. pat. delle cisti dell' ipofisi cerebrale e dell' infantilismo. Il Policlinico, sez. medica, 1906, XIII, p. 445.
12. Zöllner. Ein Fall von Tumor der Schaedelbasis ausgehend von der Hypophyse. Archiv. f. Psychiatrie, 1908, Bd. XLIV, p. 815.
13. Mixter and Quackenboss. Tumor of the Hypophysis (with infantilism). Ann. of Surg., July, 1910, vol. LII, p. 15.
14. Uhthoff. Beit. zur den Wachstums-anomalien bei der temporalem Hemianopsie resp. den Hypophysis Affectionen. Bericht über die 34 ste. Versammlung der ophtalm. Gesellschaft, Heidelberg, 1907, p. 140.
15. Cross. Hypopituitarism. New York med. Journ., 15 October, 1910, p. 771.
16. Ettore Levi. Contribution a l'étude du type Lorain. Nouvelle Iconographie de la Salpêtrière, 1908, Nos. 5 et 6.
17. Rich. Kümmell. Zur Kenntnis der Geschwülste der Hypophysengegend. Münch. med. Woch., 13 June, 1911, No. 24, p. 1293.
18. Lemann et van Wart. A case of infantilism with absence of thyroid and tumor of pituitary. Archiv. of Internat. Med., May, 1910, V, p. 519.

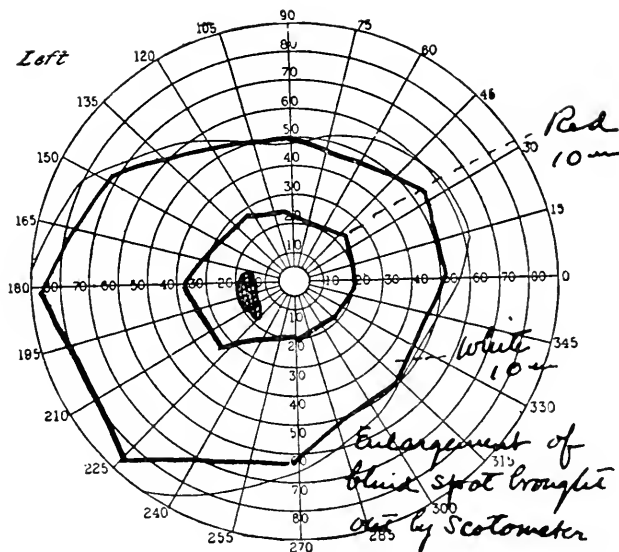
XI.

CIRCUMSCRIBED ORBITAL EDEMA FROM FRONTAL SINUSITIS.*

WM. CAMPBELL POSEY, M. D.,

PHILADELPHIA.

J. G., aged 26, a stevedore, came to the Wills Hospital on January 20th, on account of a prominence and pain in the

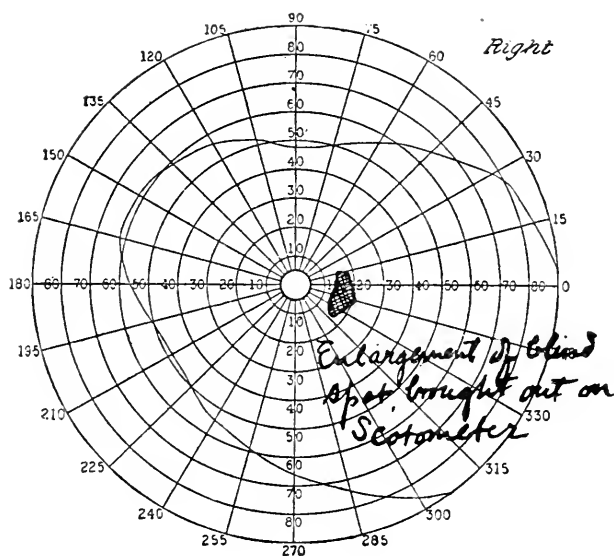


left eye, which had been present for two weeks previously. Examination showed a moderate amount of proptosis upon that side, apparently occasioned by a mass which could be palpated under the supraorbital rim, and more especially to the temporal side. The swelling was firm and smooth but

*Read at meeting of Wills Hospital Ophthalmic Society, Philadelphia, February 5, 1912.

apparently external to the periosteum. The upper lid was somewhat swollen but the conjunctiva was not involved. The outer and upper movements of the eye were restricted. The pupil was slightly larger than that of the fellow eye (i. e., 4 and 3 mm. respectively) but reacted well to light. Fundus normal, save for a slight dilatation of the retinal veins. Lymphatics of vessels not distended. Vision equalled 5 7₁₂ in left eye, that of the right eye 5 5.

It was elicited that nasal symptoms had been present more or less constantly during the past ten years. Other data which



might be construed to be causative of the present condition were absent.

Assuming that the orbital swelling was doubtless secondary to a frontal sinusitis, the patient was sent to the Howard Hospital for rhinologic examination and treatment, and Dr. George B. Wood called in consultation for this purpose. Dr. Wood's notes are as follows:

"On my first examination I found marked congestion of the mucous membrane of the left side of his nose, and swelling of the turbinal bodies. There was an excess of mucopurulent secretion, apparently coming from under the anterior end of

the left middle turbinal. On account of the marked tenderness over the frontal sinus and the swelling of the upper part of the orbit, I believe that he had at that time an acute frontal sinusitis, and to afford proper drainage I removed the anterior tip of the left middle turbinal. About ten days ago I washed out the left frontal sinus with negative results. Transillumination at that time showed equal clearness on both sides with moderately large frontal sinuses almost symmetrical in shape, the left one extending about two-thirds along the supraorbital



margin. About three days ago I saw him again, and while there was some congestion of the left nasal fossa, there was no purulent exudate and only a slight excess of a thick mucoid secretion, some of it being in the region of the frontal sinus opening. It does not seem likely to me that the man has had a purulent infection of the frontal sinus, though it is more than likely that there has been an acute congestion of the mucous membrane of the ethmoidal cells, as well as the frontal sinus."

Notwithstanding the subsidence of the sinusitis, however, the orbital swelling still persisted and it seemed desirable to ascertain its nature. An exploratory puncture was accordingly made with a hypodermic syringe, and a few drops of pus appearing, the infraorbital mass was incised, without, however, giving exit to more pus. A small drain was inserted and the wound healed promptly without further discharge. The swelling is now gradually subsiding and the proptosis with the restriction in the ocular movements disappearing. A study of the visual fields made at the first examination showed them to be normal save for slight enlargement of the blind spots. As this was noted in both eyes and was not more marked than often occurs under physiologic conditions, no significance was attributed to it.

The writer does not remember to have seen before a similar circumscribed swelling in the orbit in consequence of a sinus inflammation, and believes it to be an instance of sinus infection being followed by orbital infiltration, probably of the nature of a collateral inflammatory edema.

XII.

SHRUNKEN GLOBE ENVELOPING AN UNUSUALLY LARGE FRAGMENT OF STEEL.*

WM. CAMPBELL POSEY, M. D.,

PHILADELPHIA.

The specimen was removed from the orbit of a laborer 35 years of age, the foreign body having entered the eye in May, 1907. The patient claims to have received no treatment, but to have continued his work after a few days of application of home remedies without interruption since the date of the injury, and avers that the injured eye had given him but slight trouble. An inspection of the specimen and its description by the pathologist will render a note of its clinical appearance unnecessary. Note should be made, however, of the movements of the foreign body, as it shifted its position in synergistic action with the muscles of the other eye. Notwithstanding the involvement of the ciliary zone and the more or less irritation of the ocular tissues which the presence of such a large body must have necessitated, there were no symptoms of sympathetic irritation in the fellow eye.

Enucleation was performed a week ago and a gold ball inserted into Tenon's capsule. Healing uneventful.

Laboratory Report: Specimen, which consists of a large piece of steel enveloped in a shrunken globe, is of triangular form, the round base corresponding to the temporal, the apex to the nasal portion of the eyeball. The specimen measures 28 mm. in its horizontal diameter, 16 mm. in its vertical. Weight 142 grains, or 9.20 grams. The dimensions and weight just given correspond almost precisely to the size and heaviness of a large piece of steel which has practically obliterated the eyeball, the walls of the globe being represented by a thin shell of shrunken sclera.

*Read at meeting of Wills Hospital Ophthalmic Society, Philadelphia, February 5, 1912.

XIII.

A CASE OF MIGRAINE WITH RING SCOTOMA.*

WILLIAM ZENTMAYER, M. D.,

PHILADELPHIA.

E. P., aged 40 years, manufacturer, was sent to me May 5, 1911, by Dr. M. H. Fussell, with a diagnosis of migraine with high arterial tension.

Between the years 1883 and 1885 he had his first attacks of headache, accompanied by disturbance of vision. Two of these have been impressed upon his memory because of their severity and the circumstances accompanying them. On one occasion while attending burial services in a church yard and holding the hat of one of the pallbearers he had an attack, and on recovering his sight he was alone by the grave. On the other occasion, while returning from school he was compelled to lie down by the roadside, where he was found by his companions and taken to his home. Following this latter attack he was confined to his bed for a few days. Both of these attacks were preceded by the appearance in each temporal field of a slowly revolving wheel with flashing spokes, which he says may well be compared to an electric fan. He thinks that perhaps as long as he has had headache, but not more frequently than once a month, they have been preceded by this aura. In 1889 he had the first attack of lateral hemianopsia. In the past ten years he has had probably three such attacks. He cannot be certain, but believes that the left field was blind. The blindness is never absolute, light perception remaining. For a period of twelve years following an attack of typhoid fever he was comparatively free from headaches, but in the past year and more especially in the past six months they have increased in number and severity. During this latter period he has been under mental strain due to business troubles. They now occur almost daily, coming on about noon and

*Read before the Section on Ophthalmology of the College of Physicians of Philadelphia, December, 1911.

passing off towards evening. There is a continual sore spot extending from each side of the occiput to the shoulderblades. The headaches are always accompanied by nausea, but not vomiting, and are not influenced by the character of the food taken. Emptying the stomach relieves the headache. Visual hallucinations, convulsions, muscular weakness or sensory symptoms have never been present. He is gaining in weight.

Examination by Dr. Fussell: Lungs normal. Heart dullness somewhat to the left; second sound somewhat accentuated; otherwise normal. Abdomen large and pendulous; nothing else abnormal can be found. Reflexes are normal. February 23, 1911, systolic blood pressure 165. March 3, 1911,

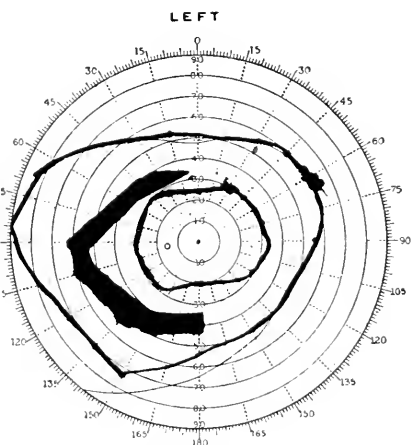


FIGURE 1.

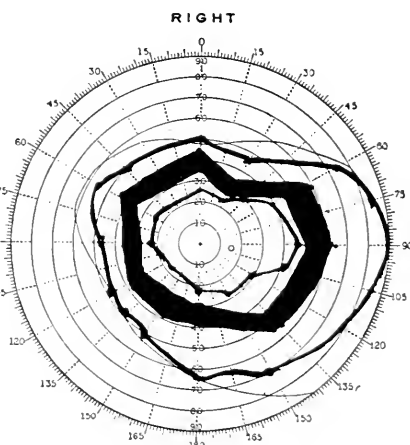


FIGURE 2.

185; April 27, 1911, 180. All taken with the Stanton instrument. Urine repeatedly examined and found normal. The patient is a tall, muscular, well nourished active man.

O. D. 6/5 (?) P. P. of accom. 27 cm.

O. S. 6/5 (??) P. P. of accom. 20 cm.

P. C. Irides prompt to light and convergence. P. P. of convergence 5 cm. Exophoria = 1° for distance and 15° for near. Abduction = 6° and adduction 12° .

Ophthalmoscopy: O. D., media clear, disk oval, axis 30° . Typical congenital conus below. No evidences of arteriosclerosis. V. V. = 1. D. O. S., same general appearances of the fundus.

Refraction under atropin cycloplegia; last test May 10, 1911.

O. D. $+1.75 \text{ } \overline{\cup} +.25 \text{ ax. } 75^\circ = 6/4.$

O. S. $+1.50 \text{ } \overline{\cup} +.50 \text{ ax. } 90^\circ = 6/4.$

.25 less was ordered for constant wear and adduction exercise prescribed. In addition, 2° prisms bases in were ordered to be worn only at time of prolonged nearwork.

On June 2, 1911, the visual field of O. D. presented a negative absolute ring scotoma 10° in width, situated between the limits of the form and red field and exactly concentric with the limits of the form field (Fig. 1). The visual field of O. S. presented a similarly situated temporal hemianopic ring

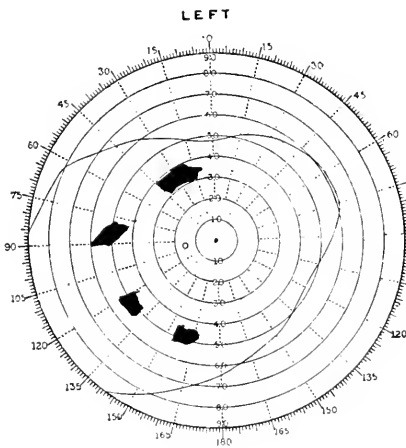


FIGURE 3.

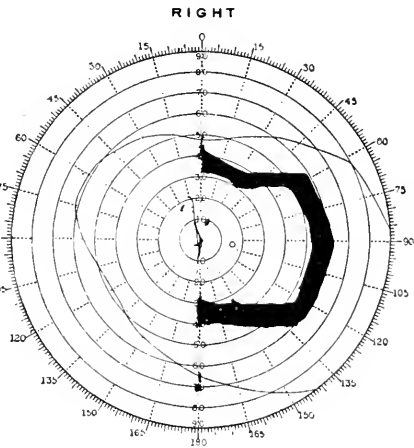


FIGURE 4.

scotoma (Fig. 2). In both eyes the limits for form and red were a trifle contracted.

Five days later the right eye presented a temporal hemianopic ring scotoma corresponding exactly with the temporal half of the original full ring scotoma (Fig. 3), and the field of the left eye showed a breaking up of the original hemianopic scotoma, leaving four dark islands varying in size from 15° to 10° (Fig. 4). At neither times of the field taking was the patient suffering from an attack of migraine.

On December 18, 1911, at my request, the patient was again examined. Vision O. D., $= 6/5$; O. S. $6/5$. With $-.25$ before each eye vision $= 6/4$ (??); accom. P. P. 19 cm.

Ex. = 1° for distance and 14° for near. L. H. = $1/4^{\circ}$. The visual fields are normal.

He states that after the glasses were prescribed the pain in the occiput and shoulders gradually disappeared so that for the past two months he has had none. The sick headaches occur now only occasionally, but he still has attacks of dizziness accompanied by a sense of fullness in the head with at times the bitemporal scintillating scotoma. He rarely feels compelled to wear the glasses containing the prisms except when reading by artificial light. He has neglected convergence exercise.

The interest in this case lies in the diversity of the visual phenomena. The occurrence at different times of homonymous lateral hemianopsia, bitemporal scintillating scotomata, ring scotoma and bitemporal hemianopsia is difficult of solution. As the pathology of migraine is still unsettled, we can but theorize regarding these phenomena.

As the condition of ring scotoma was a temporary one, but one of the many theories which have been advanced to explain the frequent presence of a similar defect in the field of vision of pigmentary degeneration of the retina is available to apply to the phenomenon in this case. The theory of O. Bull and Hersing, that ring defect in pigmentary degeneration of the retina is due to a lesion of the retinal vessels, and takes this form because of the arched course of the vessels surrounding the macula, might explain the formation of a complete ring scotoma in migraine, if we assume a vasomotor disturbance affecting these vessels, but it falls short in explanation of the temporary bitemporal form which the scotoma developed in the clearing up of the blind area.

That there was a relation between the scintillating scotoma which preceded the attacks of migraine and the dark scotoma which occurred in the interval, can hardly be questioned, and as neither of these phenomena can be satisfactorily explained by an intracranial lesion, it would seem as though we are compelled to account for it by a local vascular disturbance. Fuchs, after stating that the scintillating scotomata of migraine are undoubtedly due to a disturbance in the circulation in the cortical centers, says that when these are unilateral they are to be explained by a similar retinal disturbance.

The lateral homonymous hemianopsia is readily explained by an occipitocortical vascular disturbance.

NIV.

THE POSTMYDRIATIC EXAMINATION.

WILLIAM MARTIN RICHARDS, M. D.,

NEW YORK.

Without exception, the most difficult task in refraction work is postmydriatic subtraction. The postmydriatic examination should be two days after the mydriatic examination. The mydriatic used is two per cent homatropin and half of one per cent cocain, mixed; one drop every seven minutes for eight doses. In people over forty, to prevent glaucoma, the mydriatic examination is followed by eserine sulphate one-half per cent; one drop every six minutes for four doses, and for a longer period where there has actually been glaucoma. Many doctors make no subtraction whatever, the result being that they give comfort to such patients only as have myopia, full presbyopia, and simple and mixed astigmatism. The classes enumerated form, of course, a small proportion of cases, but patients who are hyperopic in one or both eyes are quite as much entitled to comfort as the others. The rule of postmydriatic subtraction is more what not to do than what to do, for the proper subtraction is largely a question of experience with each particular patient, subtracting within certain limits, never going beyond them, but with quite a large range, in any part of which the subtraction may be.

THE SPHERE.

When there is in both eyes myopia, simple astigmatism—myopic or hyperopic—or full presbyopia, prescribe the lenses which are found at the mydriatic examination.

CASE I.—Myopia. A salesman, 32 years old, the mydriatic correction was:

O. D. — .12 $\overline{\text{C}}$ — .12 cyl. 90

O. S. — .12 $\overline{\text{C}}$ — .37 cyl. 65

Postmydriatic: Ditto.

CASE II.—Simple Hyperopic Astigmatism. A housewife, 33 years old. Mydriatic was:

O. D. $+ 1.50$ cyl. 90

O. S. $+ 1.12$ cyl. 100

Postmydriatic: Ditto.

CASE III.—Simple Myopic Astigmatism. A housewife, 29 years old. Mydriatic was:

O. D. $- .62$ cyl. 15

O. S. $- .50$ cyl. $172\frac{1}{2}$

Postmydriatic: Ditto.

CASE IV.—Mixed Astigmatism. A housewife, 33 years old. Mydriatic was:

O. D. $- 1.12$ \subset $+ 2.25$ cyl. 90

O. S. $+ 1.0$ \subset $- 2.37$ cyl. 180

Postmydriatic: Ditto.

CASE V.—Full Presbyopia. A housewife, 65 years old. Mydriatic was:

O. D. $+ 1.25$ \subset $+ .25$ cyl. $72\frac{1}{2}$

O. S. $+ 1.12$ \subset $+ .12$ cyl. 135

Postmydriatic: Ditto. O. U., add $+ 2.50$.

If the patient is continually out of doors, a plus sphere should be 0.12 weaker and a minus sphere 0.12 stronger than that prescribed for twenty feet. A good example of the latter fell under my notice when I first began to do refraction work.

During one of my numerous attendances at baseball games I happened to sit next to a friend who wore glasses, and who confided to me that he had not been able to sleep at all for a week, whereupon I cheerfully offered to bet him twenty dollars that I could cure him without medicine. He immediately accepted my wager, having since told me that he felt that his glasses did not quite fit him, and that this was a good way to be fitted with a new pair without charge, firmly believing that they would have no effect upon his insomnia.

CASE VI.—His mydriatic was:

O. D. $+ 1.87$ cyl. 80

O. S., $- .12$ \subset $+ 2.12$ cyl. 88

At the postmydriatic test he felt more comfortable with a 0.12 subtraction than with any other, and I therefore prescribed:

O. D., $- .12$ \subset $+ 1.87$ cyl. 80

O. S., $- .25$ \subset $+ .12$ cyl. 88

not knowing that I ought to have left both lenses as they were at the mydriatic examination. At the end of a week he sent me half the wager, his insomnia having entirely disappeared, saying that he would send the other half when he was sure it was not merely a coincidence. I subsequently learned of my error in the principle of subtraction, and when he broke one of his lenses I substituted the mydriatic correction. Much to my surprise, he was most uncomfortable with it, the reason being that as a bill collector, he was generally out of doors, and the new lenses having been ordered at twenty feet, made him artificially myopic for most of the time. I immediately changed back to my first lenses, and he has since then been perfectly comfortable. In my ignorance I had stumbled on the right formula for him, for in people doing out-of-door work it is well to make a 0.12 subtraction, even in myopia, simple and mixed astigmatism, and full presbyopia. For example:

CASE VII.—In June, 1910, a medical student, age 23, consulted me for headaches, morning nausea, or, as he laughingly said, the "symptoms of pregnancy." His mydriatic showed:

O. D., — 2.37 $\overline{\cup}$ — .75 cyl. 120

O. S., — .12 $\overline{\cup}$ — .37 cyl. 172½

and his postmydriatic examination was exactly the same.

Just a year later he asked me for a larger pair of glasses for tennis, which I did not know he played. I prescribed for tennis:

O. D., — 2.50 $\overline{\cup}$ — .75 cyl. 120

O. S., — .25 $\overline{\cup}$ — .37 cyl. 172½

in torics, which are not as good as flat lenses, except for golf, tennis, billiards, etc. He did not know that the formula of these was different. A month later he informed me that his tennis playing had very much improved, and asked me if I thought the new lenses might have caused this, not knowing that the formula had been changed, a fact which I had not mentioned. The latter formula would focus at fifty feet or more, whereas the former formula was right for the twenty-foot distance at which it had been fitted.

SUBTRACTION IN HYPEROPIA.—WHEN BOTH EYES ARE HYPEROPIC.

Place the mydriatic formula in the trial frame, tell the patient to look at the test letters twenty feet away, then try one minus sphere after another in front of both eyes until the

patient finds the ones which are most comfortable for the head and eyes. In case of doubt, use the lesser of two subtractions. Do not pay any attention to the clearness of the letters, as this is of no consequence.

In patients under thirty, particularly in young people who are not very heavy near-workers, begin the postmydriatic examination with a .75 subtraction. Occasionally, however, it is necessary to use a 1.0 subtraction, or even more. For example:

CASE VIII.—A nine-year-old school boy, whose mydriatic was:

$$O. D., + 1.37 \quad \overline{\quad} \quad + .25 \text{ cyl. } 45$$

$$O. S., + 1.12 \quad \overline{\quad} \quad + .50 \text{ cyl. } 95$$

took a postmydriatic

$$O. D., + .25 \quad \overline{\quad} \quad + .25 \text{ cyl. } 45$$

$$O. S., \quad \quad \quad + .50 \text{ cyl. } 95$$

or a 1.12 subtraction, with which he is perfectly comfortable. If more than .37 is used, however, it will generally have to be decreased after the patient has worn glasses for some time.

CASE IX.—A student, 26 years old, whose mydriatic examination was:

$$O. D., + 1.12 \quad \overline{\quad} \quad + .12 \text{ cyl. } 87\frac{1}{2}$$

$$O. S., + .75 \quad \overline{\quad} \quad + .50 \text{ cyl. } 115$$

At the postmydriatic on June 10, 1911, he was most comfortable with:

$$O. D., + .37 \quad \overline{\quad} \quad + .12 \text{ cyl. } 87\frac{1}{2}$$

$$O. S., \quad \quad \quad + .50 \text{ cyl. } 115$$

a .75 subtraction, but on September 6, 1910, his mydriatic examination was:

$$O. D., + .87 \quad \overline{\quad} \quad + .37 \text{ cyl. } 90$$

$$O. S., + .62 \quad \overline{\quad} \quad + .62 \text{ cyl. } 117\frac{1}{2}$$

At his postmydriatic examination on September 8, 1910, he was more comfortable with:

$$O. D., + .50 \quad \overline{\quad} \quad + .37 \text{ cyl. } 90$$

$$O. S., + .25 \quad \overline{\quad} \quad + .62 \text{ cyl. } 115$$

a .37 subtraction.

In patients over thirty, a .37 subtraction should generally be the limit, but I have several times found it necessary to use a .75 subtraction, even in those over thirty, particularly when these patients have for years done very near work, like miniature painting, dressmaking, or engraving. For example:

CASE XI.—I was consulted by a dressmaker, 33 years old, whose mydriatic examination was:

$$O. D., + 1.50 \quad \overline{\quad} + .37 \text{ cyl. } 67\frac{1}{2}$$

$$O. S., + 1.50 \quad \overline{\quad} + .50 \text{ cyl. } 97\frac{1}{2}$$

At the postmydriatic test I prescribed:

$$O. D., + 1.12 \quad \overline{\quad} + .37 \text{ cyl. } 67\frac{1}{2}$$

$$O. S., + 1.12 \quad \overline{\quad} + .50 \text{ cyl. } 97\frac{1}{2}$$

not daring to use any greater subtraction than .37, but she suffered so continually from headaches that I later gave her:

$$O. D. + .75 \quad \overline{\quad} + .37 \text{ cyl. } 67\frac{1}{2}$$

$$O. S. + .75 \quad \overline{\quad} + .50 \text{ cyl. } 97\frac{1}{2}$$

a .75 subtraction, with perfect relief.

CASE XII.—A miniature painter, 34 years old, whose mydriatic examination was:

$$O. D. + 2.25 \quad \overline{\quad} + .50 \text{ cyl. } 90$$

$$O. S. + 2.00 \quad \overline{\quad} + .62 \text{ cyl. } 90$$

Postmydriatic was:

$$O. D. + 1.50 \quad \overline{\quad} + .50 \text{ cyl. } 90$$

$$O. S. + 1.25 \quad \overline{\quad} + .62 \text{ cyl. } 90$$

or a .75 subtraction.

CASE XIII.—A school girl, 9 years old, whose mydriatic examination showed:

$$O. D. + 1.00 \quad \overline{\quad} + .25 \text{ cyl. } 35$$

$$O. S. + 1.00 \quad \overline{\quad} + .25 \text{ cyl. } 90$$

Postmydriatic examination:

$$O. D. + .37 \quad \overline{\quad} + .25 \text{ cyl. } 37\frac{1}{2}$$

$$O. S. + .37 \quad \overline{\quad} + .25 \text{ cyl. } 90$$

which is a .62 subtraction. With O. U. + .62 added for reading she was most comfortable.

It is common in refraction work to have to subtract at the postmydriatic the same amount which you subsequently have to replace in bifocals for reading, as above.

CASE XIV.—A newspaper reporter, age 32, whose mydriatic showed:

$$O. D. + .50 \quad \overline{\quad} + .37 \text{ cyl. } 20$$

$$O. S. + .87 \quad \overline{\quad} + .25 \text{ cyl. } 97\frac{1}{2}$$

and postmydriatic showed:

$$O. D. \quad \quad \quad + .37 \text{ cyl. } 20$$

$$O. S. + .37 \quad \overline{\quad} + .25 \text{ cyl. } 97\frac{1}{2}$$

a .50 subtraction.

CASE XIV.—A physician, 38 years old, whose mydriatic showed:

$$O. D. + 1.25 \text{ } \overline{\text{C}} + .25 \text{ cyl. } 83\frac{1}{2}$$

$$O. S. + 1.12 \text{ } \overline{\text{C}} + .25 \text{ cyl. } 77$$

Postmydriatic:

$$O. D. + .87 \text{ } \overline{\text{C}} + .25 \text{ cyl. } 83\frac{1}{2}$$

$$O. S. + .75 \text{ } \overline{\text{C}} + .25 \text{ cyl. } 77$$

which was a .37 subtraction. O. U., add + .37.

Note that he took the same formula for reading that he had formerly used at the mydriatic examination.

CASE XV.—A school teacher, 45 years old, whose mydriatic showed:

$$O. D. + 2.75 \text{ } \overline{\text{C}} + .50 \text{ cyl. } 75$$

$$O. S. + 1.60 \text{ } \overline{\text{C}} + .62 \text{ cyl. } 125$$

Postmydriatic showed:

$$O. D. + 2.50 \text{ } \overline{\text{C}} + .50 \text{ cyl. } 75$$

$$O. S. + .75 \text{ } \overline{\text{C}} + .62 \text{ cyl. } 125$$

which is a .25 subtraction. O. U., add + .75 for reading.

CASE XVI.—A sociological worker, 26 years old, with a mydriatic of:

$$O. D. + 1.50 \text{ } \overline{\text{C}} + .50 \text{ cyl. } 80$$

$$O. S. + 1.75 \text{ } \overline{\text{C}} + .12 \text{ cyl. } 97\frac{1}{2}$$

Postmydriatic:

$$O. D. + 1.37 \text{ } \overline{\text{C}} + .50 \text{ cyl. } 80$$

$$O. S. + 1.62 \text{ } \overline{\text{C}} + .12 \text{ cyl. } 95$$

which is a .12 subtraction, and which gave perfect comfort.

CASE XVII.—An automobile sales-man, 24 years old, whose mydriatic showed:

$$O. D. + .62 \text{ } \overline{\text{C}} + .25 \text{ cyl. } 72\frac{1}{2}$$

$$O. S. + .37 \text{ } \overline{\text{C}} + .25 \text{ cyl. } 120$$

Postmydriatic:

$$O. D. + .62 \text{ } \overline{\text{C}} + .25 \text{ cyl. } 75$$

$$O. S. + .37 \text{ } \overline{\text{C}} + .25 \text{ cyl. } 120$$

which is a full mydriatic correction. O. U., add — .62 in bifocals. As he was out of doors a great deal and had not been able to see over a distance of twenty feet well with the above, I prescribed 0.12 S. weaker for out of doors, as an 0.12 lens focuses at twenty-five feet. When he was in the street, therefore, his glasses were:

$$O. D. + .50 \text{ } \overline{\text{C}} + .25 \text{ cyl. } 75$$

$$O. S. + .25 \text{ } \overline{\text{C}} + .25 \text{ cyl. } 120$$

CASE XVIII.—On April 28, 1911, a little girl of nine consulted me with the following history: A few months before she had what one doctor diagnosed as "membranous croup," but which another doctor thought to be catarrhal laryngitis. After she recovered she was unable to see book print. She consulted an oculist, who prescribed without a mydriatic:

O. D. $+ 1.0 \quad \ominus + .50$ cyl. 90

O. S. $+ 1.25$

which gave her diplopia, dizziness and headaches. Her mydriatic examination showed:

O. D. $+ 1.25 \quad \ominus + .12$ cyl. $172\frac{1}{2}$

O. S. $+ 1.12 \quad \ominus + .12$ cyl. $7\frac{1}{2}$

At the postmydriatic examination on April 30th she was more comfortable, for distance, with the full mydriatic formula, or no subtraction, and a week afterwards she accepted O. U., add $+ .87$. She could then read with her grandmother's glasses, O. U., $+ 2.0$, which she had unsuccessfully tried to do before her illness, which showed that her sickness had changed the elasticity of her ciliary apparatus. With this addition her diplopia permanently disappeared.

This illustrates how early premature presbyopia may appear, and when we find at the postmydriatic examination a smaller subtraction than is usual, at any given age, we may be quite sure that we have premature presbyopia, or subnormal accommodation.

In hyperopia, as presbyopia advances, it is generally necessary to decrease the subtraction and increase the reading addition, until at fifty-five, sixty, or later, there is no subtraction at all, and the reading addition reaches 2.50.

CASE XIX.—An insurance agent, 42 years old, whose mydriatic showed:

O. D. $+ .50 \quad \ominus + .50$ cyl. 75

O. S. $+ .75 \quad \ominus + .37$ cyl. 125

The postmydriatic was:

O. D. $+ .25 \quad \ominus + .50$ cyl. 75

O. S. $+ .50 \quad \ominus + .37$ cyl. 125

which was a .25 subtraction. O. U., add $+ .37$.

CASE XX.—A magazine editor, 48 years old, whose mydriatic showed:

O. D. $+ .87 \quad \ominus + .12$ cyl. 135

O. S. $+ .75 \quad \ominus + .12$ cyl. 165

Postmydriatic showed:

$$O. D. + .75 \text{ } \overline{\text{C}} + .12 \text{ cyl. } 135$$

$$O. S. + .62 \text{ } \overline{\text{C}} + .12 \text{ cyl. } 165$$

which was a .12 subtraction. O. U., add + .75.

CASE XXI.—A housewife, 58 years old, whose mydriatic showed:

$$O. D. + 1.12 \text{ } \overline{\text{C}} + .25 \text{ cyl. } 80$$

$$O. S. + .12 \text{ } \overline{\text{C}} + .87 \text{ cyl. } 95$$

Postmydriatic showed:

$$O. D. + 1.12 \text{ } \overline{\text{C}} + .25 \text{ cyl. } 80$$

$$O. S. + .12 \text{ } \overline{\text{C}} + .87 \text{ cyl. } 100$$

O. U., add + 2.50.

When it is possible, it is my custom to examine a patient's eyes for subnormal accommodation one week after the post-mydriatic examination, though such patients should do no more work in the meantime, as in this way any pathologic condition is much improved and the reading addition found is more likely to be comfortable. Always give the same addition for reading in both eyes unless one of them is amblyopic.

CASE XXII.—A specialist in drug habits, 54 years old, whose mydriatic examination showed:

$$O. D. - .37 \text{ } \overline{\text{C}} - .62 \text{ cyl. } 45 = 20 \text{ } 20$$

$$O. S. - .25 \text{ } \overline{\text{C}} - 1.62 \text{ cyl. } 125 = 20 \text{ } 50$$

Postmydriatic, ditto; Right, add + 1.37. Left, add + 2.12.

At the end of two years his refraction was, mydriatic:

$$O. D. - .12 \text{ } \overline{\text{C}} - .62 \text{ cyl. } 45 = 20 \text{ } 13$$

$$O. S. + .25 \text{ } \overline{\text{C}} - 2.25 \text{ cyl. } 135 = 20 \text{ } 13$$

Postmydriatic: Ditto. O. U., add + 1.62.

Even when one eye is considerably amblyopic, however, the patient is sometimes more comfortable with the same reading addition in both eyes.

CASE XXIII.—A stenographer, age 23, whose mydriatic showed:

$$O. D. + .25 \text{ } \overline{\text{C}} + .37 \text{ cyl. } 22\frac{1}{2} = 20 \text{ } 13 - 1$$

$$O. S. + 2.0 \text{ } \overline{\text{C}} + .62 \text{ cyl. } 175 = 20 \text{ } 40 - 1$$

Postmydriatic showed:

$$O. D. + .12 \text{ } \overline{\text{C}} + .37 \text{ cyl. } 22\frac{1}{2} = 20 \text{ } 13$$

$$O. S. + 1.87 \text{ } \overline{\text{C}} + .62 \text{ cyl. } 175 = 20 \text{ } 40$$

O. U., add + .62.

She said she felt most uncomfortable if I attempted to increase the reading addition of the left eye even as little as 0.12 or 0.25, and the more I increased it the more uncomfortable she felt, yet she was perfectly comfortable with the same addition in each eye.

As a rule it is unwise to prescribe a smaller reading addition than $+ .37$, as anything less than this may be compensated for by holding work slightly farther away. The most common addition for people under forty is $+ .37$, and for those up to forty-six $+ .62$. From forty-six to fifty it gradually increases up to 1.50, and from there until full presbyopia, it gradually increases up to 2.50, which is the limit of what should be added. (See cases XIX, XX, XXI.)

A moment's thought will show why this should be so. An 0.12 glass focuses at twenty-five feet, or approximately twenty feet, which is the ordinary distance used in refraction work. Fifteen inches is the most comfortable distance at which to do near work, and this is the focal distance of a $+ 2.62$ glass, or a $+ 2.50$ added to a $+ 0.12$. It has been my experience that the most common cause of discomfort in presbyopes is too strong a magnifying glass added to the distance correction.

CASE XXIV.—In March of last year a lady of 58 years consulted me, wearing for distance:

O. D. $+ .12 \supset + 1.50$ cyl. 90

O. S. $+ .12 \supset + .50$ cyl. 90

and for reading:

O. D. $+ 2.87 \supset + 1.50$ cyl. 90

O. S. $+ 2.87 \supset + .50$ cyl. 90

which was a $+ 2.75$ addition. This caused her great discomfort, but the proper formula with $+ 2.50$ added made her comfortable.

SUBNORMAL ACCOMMODATION.

A good way to find out whether a patient needs anything added for reading is to have him look at the test letters twenty feet away, with the distance glasses. If a pair of $-.25$ S. lenses in front of the distance lenses does not improve the clearness of the letters, this reveals a lack of elasticity in the ciliary ligament, and there is subnormal accommodation,

which is of course confirmed by the fact that a magnifying glass, of the right strength, added increases the blackness of black print and the whiteness of the paper background.

CASE XXV.—On April 28th of this year a boy, aged 19, consulted me whose mydriatic examination showed:

$$O. D. + .37 \text{ } \overline{\text{cyl.}} + .75 \text{ cyl. } 107\frac{1}{2}$$

$$O. S. \quad \quad + .62 \text{ cyl. } 90$$

His postmydriatic examination revealing the same formula as the mydriatic, I expected to find subnormal accommodation, as I did not believe that the need for the above formula explained his absolute inability to study without distress in his head and eyes. One week afterwards I tried in front of his eyes a couple of — .25 spheres, which did not improve the clearness of the letters at all, and + .37 added for reading has entirely abolished all his discomfort. Later he became more hyperopic, took a .25 subtraction and did not need any reading addition.

WHEN ONE EYE IS HYPEROPIC AND THE OTHER HAS SIMPLE ASTIGMATISM.

Where one eye is hyperopic, and the other has simple astigmatism, myopic or hyperopic, place the formula found at the mydriatic examination in the trial frame, leave as it was the eye which had simple astigmatism at the mydriatic examination, and ascertain the subtraction of the hyperopic eye by placing in front of it one concave lens after another until the eyes and head are perfectly comfortable while looking, with both eyes, at illuminated letters twenty feet away.

The subtraction in this case will as a rule be less than it would have been had both eyes been hyperopic. But this is not always the case.

CASE XXVI.—A school superintendent, 34 years old, whose mydriatic showed:

$$O. D. + .75$$

$$O. S. + .62 \text{ cyl. } 115$$

Postmydriatic showed:

$$O. D. + .37$$

$$O. S. + .62 \text{ cyl. } 115$$

When one eye is hyperopic, and the other is myopic, repeat the above process of subtraction on the hyperopic eye. For example:

CASE XXVII.—I was consulted by a bill collector in October, 1910, whose mydriatic examination was:

$$\text{O. D.} - .37 \bigcirc - .25 \text{ cyl. } 50$$

$$\text{O. S.} + .62 \bigcirc + .75 \text{ cyl. } 175$$

Postmydriatic showed:

$$\text{O. D.} - .37 \bigcirc - .25 \text{ cyl. } 47\frac{1}{2}$$

$$\text{O. S.} + .37 \bigcirc + .75 \text{ cyl. } 175$$

When the sphere in the hyperopic eye is not greater than 0.25, as a rule no subtraction is necessary. For example:

CASE XXVIII.—I was once consulted by a student 25 years old, whose mydriatic examination showed:

$$\text{O. D.} - .87 \bigcirc - .12 \text{ cyl. } 95$$

$$\text{O. S.} + .12 \bigcirc + .12 \text{ cyl. } 95$$

and whose postmydriatic examination showed:

$$\text{O. D.} - .87 \bigcirc - .12 \text{ cyl. } 95$$

$$\text{O. S.} + .12 \bigcirc + .12 \text{ cyl. } 95$$

When one eye is hyperopic, and the other has mixed astigmatism, treat as if one eye were hyperopic and the other had simple astigmatism, as in Case XXVI.

CASE XXIX.—A school teacher, aged 28, whose mydriatic was:

$$\text{O. D.} + .50 \bigcirc + .25 \text{ cyl. } 17\frac{1}{2}$$

$$\text{O. S.} - .12 \bigcirc + .75 \text{ cyl. } 125$$

Postmydriatic was:

$$\text{O. D.} + .25 \bigcirc + .25 \text{ cyl. } 17\frac{1}{2}$$

$$\text{O. S.} - .12 \bigcirc + .75 \text{ cyl. } 127\frac{1}{2}$$

When one eye has mixed astigmatism and the other simple hyperopic astigmatism, make no subtraction.

CASE XXX.—A private secretary, 34 years old, whose mydriatic showed:

$$\text{O. D.} - .37 \bigcirc + .75 \text{ cyl. } 70$$

$$\text{O. S.} + .62 \bigcirc + .62 \text{ cyl. } 105$$

Postmydriatic, ditto.

When one eye has myopia or simple myopic astigmatism, and the other has mixed astigmatism, treat the eye with the mixed astigmatism exactly as if it were hyperopic and leave the other eye the same as at the mydriatic examination. For example:

CASE XXXI.—February, 1910, a cashier, 18 years of age, consulted me, and her mydriatic examination showed:

$$O. D. - .50 \text{ } \overline{\text{C}} + 1.62 \text{ cyl. } 92\frac{1}{2}$$

$$O. S. - 2.12 \text{ } \overline{\text{C}} - 2.37 \text{ cyl. } 15$$

At the postmydriatic examination she accepted:

$$O. D. - .75 \text{ } \overline{\text{C}} + 1.62 \text{ cyl. } 92\frac{1}{2}$$

$$O. S. - 2.12 \text{ } \overline{\text{C}} - 2.37 \text{ cyl. } 15$$

CASE XXXII.—Again, in June, 1911, I was consulted by a housewife 37 years old, whose mydriatic showed:

$$O. D. + .62 \text{ } \overline{\text{C}} - 1.75 \text{ cyl. } 170$$

$$O. S. - 1.0 \text{ cyl. } 180$$

At the postmydriatic she accepted:

$$O. D. + .37 \text{ } \overline{\text{C}} - 1.75 \text{ cyl. } 170$$

$$O. S. - 1.0 \text{ cyl. } 180$$

The latter patient had almost a year of misery from my ignorance that this was the way to manage such a case.

THE CYLINDER.

In the postmydriatic examination never change the strength of the cylinder found at the mydriatic examination. This is the one thing that we always ascertain at the mydriatic examination, and at no other time.

AXIS.

As a rule, the best way to find the axis at the postmydriatic examination is by what is known as the pendulum method. Having ascertained the proper sphere for each eye, place the cylinder at the axis found at the mydriatic examination, swing the lens 10° in one direction, asking the patient if the image and the sensation in the eye and head are improved. Then swing the cylinder 10° in the opposite direction, and repeat the process. Then 5°; then 2½°. As a rule, the axis found in the postmydriatic examination will correspond to that found in the mydriatic examination. When this is over 5° different from that found at the mydriatic examination, it generally indicates that the refraction of the eyes has changed between the two examinations, and the work ought to be done all over again.

CASE XXXIII.—An osteopathist, age 49 years. Mydriatic examination showed:

$$\text{O. D. } + .37 \text{ } \overline{\subset} \text{ } + .50 \text{ cyl. } 90$$

$$\text{O. S. } + .75 \text{ } \overline{\subset} \text{ } + .25 \text{ cyl. } 95$$

At the postmydriatic examination, the axis of the right eye was unchanged, but that of the left eye was axis 115 instead of axis 95, as at the mydriatic examination. On reexamination under a mydriatic examination I found:

$$\text{O. D. } + .50 \text{ } \overline{\subset} \text{ } + .50 \text{ cyl. } 90$$

$$\text{O. S. } + .75 \text{ } \overline{\subset} \text{ } + .25 \text{ cyl. } 127\frac{1}{2}$$

Postmydriatic examination was:

$$\text{O. D. } + .37 \text{ } \overline{\subset} \text{ } + .50 \text{ cyl. } 90$$

$$\text{O. S. } + .62 \text{ } \overline{\subset} \text{ } + .25 \text{ cyl. } 127\frac{1}{2}$$

an 0.12 subtraction. With O. U., + 1.0 added the glasses were satisfactory.

CASE XXXIV.—A clerk, 25 years old, whose mydriatic examination showed:

$$\text{O. D. } + .12 \text{ } \overline{\subset} \text{ } + .37 \text{ cyl. } 30$$

$$\text{O. S. } + 1.25 \text{ } \overline{\subset} \text{ } + .25 \text{ cyl. } 150$$

His postmydriatic showed:

$$\text{O. D. } \quad \quad \quad + .37 \text{ cyl. } 30$$

$$\text{O. S. } + 1.12 \text{ } \overline{\subset} \text{ } + .25 \text{ cyl. } 150$$

which were the same axes as found at the mydriatic examination.

CASE XXXV.—A banker, 72 years old, whose mydriatic showed:

$$\text{O. D. } + 2.50 \text{ } \overline{\subset} \text{ } + .25 \text{ cyl. } 90$$

$$\text{O. S. } + 2.37 \text{ } \overline{\subset} \text{ } + .50 \text{ cyl. } 50$$

Postmydriatic showed:

$$\text{O. D. } + 2.50 \text{ } \overline{\subset} \text{ } + .25 \text{ cyl. } 85$$

$$\text{O. S. } + 2.37 \text{ } \overline{\subset} \text{ } + .50 \text{ cyl. } 52\frac{1}{2}$$

O. U., add + 2.50.

In this case the axis of the right eye was 5° different and that of the left eye was 2° different at the postmydriatic from what it was at the mydriatic.

Frequently at the postmydriatic examination the axis of one eye or the other appears to be different from the mydriatic

axis when the eyes are tested separately, but when they are tested together, the axes are found to be the same as at the mydriatic examination, especially if the patient is asked in which position the letters look the whitest and the paper looks the blackest, or vice versa, if black letters and white paper are used. For example:

CASE XXXVI.—A salesman, 18 years old, consulted me, and his mydriatic examination showed:

$$O. D. + .50 \subset + .37 \text{ cyl. } 80$$

$$O. S. + .62 \subset + .25 \text{ cyl. } 85$$

and his postmydriatic was:

$$O. D. \quad \quad \quad + .37 \text{ cyl. } 80$$

$$O. S. + .12 \subset + .25 \text{ cyl. } 85$$

but until I tested him with both eyes open and asked him which made the letters whiter, and the black paper blacker, he preferred axis 80 instead of the axis 85 in the left eye. Again:

CASE XXXVII.—I was consulted by a stenographer whose mydriatic examination showed:

$$O. D. - 3.75 \subset - 1.0 \text{ cyl. } 135$$

$$O. S. - 2.50 \subset - 2.87 \text{ cyl. } 50$$

and whose postmydriatic examination was the same. But with the left eye separately, the axis was 45 instead of 50, as it was with both eyes open.

PRISMS.

Never use prisms for heterophoria, if you have fusion of the two images. For example:

CASE XXXVIII.—A quarry inspector, 39 years old, consulted me, and his mydriatic examination showed:

$$O. D. - 1.87 \subset - 1.62 \text{ cyl. } 180$$

$$O. S. - 2.25 \subset - 2.0 \text{ cyl. } 160$$

Postmydriatic examination, ditto.

Three degrees of left hyperphoria, thirty-two degrees of esophoria, perfect fusion of images without prisms.

Do not use the prisms if you do not have fusion of the images, unless one image is formed higher than the other. When there is so much hyperphoria that the patient sees double, correct one-half of the hyperphoria if fusion results, as in the following case:

CASE XXXIX.—A librarian, 46 years old, whose mydriatic showed:

$$\text{O. D. } + 1.12 \text{ } \overline{\subset} \text{ } + .25 \text{ cyl. } 150 = 20/13$$

$$\text{O. S. } + .50 \text{ } \overline{\subset} \text{ } + .50 \text{ cyl. } 97\frac{1}{2} = 20/13$$

and the postmydriatic was:

$$\text{O. D. } + 1.0 \text{ } \overline{\subset} \text{ } + .25 \text{ cyl. } 150$$

$$\text{O. S. } + .37 \text{ } \overline{\subset} \text{ } + .50 \text{ cyl. } 97\frac{1}{2}$$

fourteen degrees of right hyperphoria. Patient had diplopia, so I added to the right lens $3\frac{1}{2}^{\circ}$ prism, B. D., and the left lens $3\frac{1}{2}^{\circ}$ B. U., gradually decreasing the strength of the prisms, until only the lenses correcting the ametropia were used.

When I first began to do refraction work I knew so little about subtraction that I used none whatever, and only such patients as had myopia, full presbyopia, or simple or mixed astigmatism were made comfortable with my prescriptions. With far-sighted people I failed almost invariably, and the information contained in this article was obtained by bitter experience. I have written it down trusting it may be of assistance to others.

ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

(UNITED STATES OF AMERICA.)

BY

MATTHIAS LANCKTON FOSTER, M. D.,

NEW ROCHELLE.

HAROLD G. GOLDBERG, M. D.,

PHILADELPHIA.

OSCAR WILKINSON, M. D.,

WASHINGTON.

AND

ARTHUR F. AMADON, M. D.,

BOSTON.

A Mixed Tumor of the Lacrimal Gland.

KNAPP, GEORGE H. (*Archives of Ophthalmology*, January, 1912), describes the tumor as almost spherical in form, of firm consistence, and its greatest diameter measuring 20 mm. The growth was encapsulated and consisted of a stroma of loose fibrous tissue and a parenchyma made up of cells approximately of the endothelial type, having a large, homogeneous, evenly staining nucleus, and arranged in the form of long strands or closely packed in groups having a rounded outline, or having an arrangement resembling that of the acini of the normal lacrimal gland. He goes on to say that tumors of the lacrimal gland are first noticed in early life, they are of slow growth, painless, produce pressure symptoms only, and are of low malignancy, with little tendency to recur after removal. Exceptionally they are said to have malignant tendencies.

H. G. G.

A New Method in Operating for Ectropion.

DAVIS, A. EDWARD (*Jour. A. M. A.*, November 18, 1911), reports a case in which he applied what he calls a new principle in operating for ectropion, which he thus describes:

"The principle consists in shortening the tarsus at the temporal extremity, and then attaching this extremity to the periosteum of the temporal border of the orbit, on a level slightly above the lid commissure if the lower lid is affected, and below the commissure if the upper lid is in fault."

A few more operations under the eyes of competent observers need to be performed before any decision as to the value of this method can be made. M. L. F.

Gummatous Inflammation at the Inner Canthus, Simulating Dacryocystitis.

LUEDDE, W. H., St. Louis (*American Journal of Ophthalmology*, January, 1912), reports a rather unusual case of syphilitic disease about the lacrimal sac, which was diagnosed and treated at first as a dacryocystitis. The point made, that irrigating fluid passed freely into the nose and that therefore suspicion should have been excited immediately of disease outside of the sac, or at least not dependent on a fault of drainage, is well taken. The observation that the patient grew worse under small doses of K. I., and then recovered rapidly under large doses is worthy of emphasis, although the fact that such is frequently the case in the treatment of syphilis can hardly be said to be new. M. L. F.

Report of Three Cases of Xerosis Epithelialis With Involvement of the Cornea.

DUTROW, HOWARD V., Ancon, Canal Zone (*Ophthalmic Record*, October, 1911), reports these three cases which came under his observation in the hospital at Ancon, the subjects being South Americans.

The first was a laborer aged 25, who said he had coal dust in his left eye. He had acute conjunctivitis with a marginal corneal ulcer on the temporal side. Vision in this eye was 20/200, the cornea was infiltrated and there was photophobia and lacrimation. He was treated for serpiginous ulcer, but without effect. More vigorous treatment was adopted and two subconjunctival injections of fifteen minims each of normal

salt solution were given at ten day intervals, which seemed to aggravate the chronic process.

A culture taken at this time from the surface of the cornea and the conjunctival sac showed bacillus xerosis in pure culture. On account of the close association of this organism with that of the bacillus diphtheria, 6,000 units of diphtheritic antitoxin were administered. Actual cautery was applied twice without effect. After ten months he was discharged from the hospital, his eye useless. The ulceration had traveled over the entire cornea and had subsided spontaneously.

The second case, also a laborer, aged 22, reported having coal dust blown into his right eye four days before entering the hospital. This he said caused water to run from the eye. He also said that one month before that time his eye had pricked him, especially when he rotated the eyeball. When seen there was slight swelling of the lids, chemosis of the ocular conjunctiva, photophobia, lachrimation, ciliary injection and hyperemia of the iris with a large superficial ulcer on the center of the cornea. Vision was reduced to light perception. The usual treatment for ulcerative keratitis was ineffective. No history of lues, and the Wassermann test negative. A culture taken from the eye showed a pure growth of bacillus xerosis. He was then given a more nutritious diet, also a dram of elixir of iron, quinin and strychnin three times a day with urotropin, 10 grains. The eye was kept bandaged, well irrigated and was given every local treatment known. After two weeks of this treatment the cornea began to improve, the progress of destruction was arrested and one-third of the cornea saved. Vision—Can count fingers at eighteen inches.

The third case was 30 years old. When seen he had swelling of the upper eyelid of the right eye, conjunctivitis, ciliary injection, and hypertrophy of the lacrimal gland. Also photophobia and lachrimation. Vision in this eye was 20/200. Syphilis was suspected, but the patient denied this, and a Wassermann test was negative, but one given twenty days later proved to be positive. The ulcer in this case was only superficial. A culture taken from it showed xerosis bacillus in pure culture. Meantime the eye had resisted treatment. After the second Wassermann test, salvarsan, 0.6 of a gramme, was given intravenously, which seemed to lessen the lachrimation and swelling of the lids but did not affect the cornea.

A full diet with tonic, as in the previous case, was then given and within ten days a marked improvement was seen and vision increased to 20/70.

The writer remarks that these were the only cases of this disease with keratitis occurring in Ancon hospital since the American occupation. He is of the opinion that this organism is the causative factor of keratomalacia in adults. Commenting on the profuse lacrimation he says, the stimulation of the lacrimal gland is due to the effect of the ulceration upon the nerve endings in the cornea. He does not believe that the constitutional condition of a patient is responsible for this disease, but thinks that building up the general health has much to do with controlling the ulcerative process. O. W.

A Case of Keratitis Rosacea.

CHANCE, BURTON, Philadelphia (*New York Medical Journal*, February 3, 1912), reports a case of this disease, which is so rare that we transcribe the report in full.

"The patient was a man aged forty-two years. He had been freckled faced in boyhood, but had no other dermal blemish until he was eighteen years old, when his nose became red. At that time, and for the three years previous, he had been employed in a hosiery mill, and he believed that there was something irritating in the oily materials with which he had to work that had caused this redness; the oils, and the use of grease paint, for he was quite athletic and frequently appeared as a clown gymnast. For several years, each spring-time, the redness recurred. He did not worry about it, because the redness faded of itself in the cold weather, and because it seemed to be benefited by the use of a well advertised skin soap.

His worst attack was when he was twenty-six years old, and this lasted for four months. When it subsided his eyes became affected. He had styes at first and then photophobia and lacrimation, and his sight rapidly became clouded so that by the end of two weeks he could not see. The visual symptoms lasted for about four months, and by this time the skin had become pale and smooth again. After a week or two the irritative symptoms subsided so that he was able to see a little. On recovery he had useful sight which remained but little changed until 1903, when he had repeated but brief

alternate attacks of redness of the skin and inflammation of the eyes.

During all the years he had not had any special treatment for either the eyes or the skin, but had used only the proprietary soap. He had had two attacks each year in the spring and autumn. In 1902, however, he did consult a physician who prescribed a salve which he used only for two weeks. In 1903 he was taken into the police force of the city and is still employed on a patrol wagon.

I saw him first as a hospital patient in 1899. He reported then because of styes, for which some simple treatment was given. His corneas showed the scars from old superficial disease. The man did not continue long under treatment at that clinic and he was lost sight of until 1904, when he came to the Germantown hospital with progressive involvement of the corneas. At that time holocain and atropin were used. The symptoms were soon alleviated, though the skin symptoms began to increase, but the progress of the case could not be observed because the patient again disappeared and was lost sight of until June, 1908, when he visited me at my office. He had had "ulcers of the cornea" of the right eye for the eight months past, and "crops" of ulcers on all his eyelids.

At this time the corneas showed extensive erosions which were greater in the right than in the left. These occupied the area of the fissures, although the peripheral portions were studded with minute areas of infiltrate beneath the epithelium. There was distinct vascularity, the vessels being tortuous and looped. The whole of the cornea was edematous and there was marked photophobia. The lids were boggy, the glands were congested, their ducts obstructed, out of the mouths of which the contents could be expressed. Atropin and zinc lotions were ordered and a saturated solution of sodium salicylate with cathartic pills were prescribed for the maintenance of gastrointestinal antiseptis. After forty-eight hours there was less edema of the corneas and the peripheral portions seemed to be clearer, while the photophobia was distinctly reduced. The patient did not report again for eight weeks.

By this time the eroded areas were distinctly necrotic, the patches had become quite wide on each cornea, and the remaining portions were very uneven. I touched the denuded sur-

faces with carbolic acid, and hot compresses were applied steadily and a solution containing holocain, etc., was instilled every three hours. After two days there was a marked regression, though the globes were excessively vascularized.

One week later both the skin and the eyes were less affected, and for the first time it was possible to ascertain the visual acuity; in the right it was 5/25; in the left, 5/30. I allowed the man to return to duty.

By August 23d, his weight had increased to 190 pounds, an increase of ten pounds since June 5th. Chalazial masses had formed in the right lower lid. These were incised and their contents removed, the wounds healed promptly, and by the end of a week the man disappeared and was not seen again by me until July 13, 1911, when he consulted me, stating that his left eye had been inflamed for several days. The globe was congested, and the cornea quite vascular. In the center of the cornea the surface was depressed in little pits, and the substance was occupied by a grayish infiltrate.

Treatment was maintained, except that arsenic was withdrawn, and the face of the patient was exposed to the X-rays.

By October 20th, the scattered foci were fewer in number and the infiltrate seemed to have become concentrated in the fissures, while the epithelium had become so much restored that the fluorescein did not stain it, and large, singularly looped vessels stretched across from the limbus to the 'moth eaten patch.' The lids remained boggy. In the superior and inferior portions of the left cornea there was no sign of recent or old disease. The iris was clearly seen. On the pupillary edge were two tags which seemed to be the stumps of a pupillary membrane fiber. The nasal fragment was rather thick and the filament was curled; the temporal filament appeared to be adherent to the central opacity in the posterior surface of the cornea. In neither eye were there signs of exudative iritis. The fissural patch had begun to contract; but an edema of the cornea prevented a clear view of the fundus.

By November 28th, the general symptoms had subsided to a remarkable degree. The surface of the skin was smooth, without thickening and prominence of the follicles. The rosy hue remained because of the chronically dilated venules. The lids were thin and healthy. There was no photophobia nor tarsal cramp. The globes were white, the corneas free from

vascularity, the obliterated vessels showing their branchings by transmitted light. The left corneal surface was quite smooth, the right uneven because of the wider distribution of the deposits.

The man has always been of steady habits. He has been vigorous in health, being quite athletic. Almost anything agrees with him and his appetite is always good. He has been pure in his personal life. He was married at twenty-five years of age, but has only one child, a son of fourteen years. Since marriage the disease of his eyes has been worse than before. He has never noticed any causal relation between the state of his general health and the onset or progress of the skin disease, nor of the ocular lesions. He maintains the idea that the onset of the disease followed his working among the oily yarns and in the use of theatrical grease paint."

Chance considers the holocain to be of exceptional value in the treatment and that the rice diet had a very beneficial effect.

M. L. F.

Individual Differences of the Normal Ciliary Body—A Contribution to the Study of Glaucoma.

HESS, C., Wurzburg (*Archives of Ophthalmology*, January, 1912), produces eight illustrations showing parts of the ciliary system of different normal eyes as they appear in the strong, down falling light of a Zeiss arc light, magnified twenty times. It is seen that in an infant the ciliary processes are narrow, thin bands fairly far apart, with flat irregular folds between them, that the surface of the processes is uniformly pigmented and that a considerable space separates their apices from the margin of the lens. In the eye of the 80-year-old man the individual processes are thicker and plumper, often thickened like clubs toward the lens; the intermediate spaces between the individual processes are much smaller; at the bottom of these spaces numerous lumpy or sausage-shaped knobs are visible. The summits of the processes, which in the infant form straight, dark, comparatively narrow stripes, here appear to be white, irregular, much broader, and studded with bulbous outgrowths. The distance from the lens is considerably less than in the infant, the broad, clubbed processes reach in many cases to the equator, in other eyes they extend more or less toward the anterior surface of the lens. The ciliary process of an 80-year-old man is, in the neighborhood of its apex,

about three times as thick as in the infantile eye. The iris itself, especially near its root, is not infrequently twice as thick in the eyes of old people as in those of infants. The vessels in the senile iris often are distinctly visible as grey tubes, while in young eyes little or nothing can usually be perceived. The writer believes that these observations are of importance in the consideration of the production of glaucoma.

H. G. G.

A Case of Ring Sarcoma of the Ciliary Body.

ALLING, A. N., and KNAPP, ARNOLD (*Archives of Ophthalmology*, November, 1911), report the case of a woman, aged 60 years, who complained of failing vision in one eye for two years. An examination showed a somewhat shallow anterior chamber, a pupil moderately dilated and immovable, a cataractous lens, tension $-\frac{1}{2}$ 2, and absence of light perception. On the sclera below and to the nasal side, nearly touching the cornea, was a slightly elevated irregularly elliptical tumor about 12 mm. in its longest diameter. Two other tumors of the same sort were seen above the horizontal meridian at varying distances from the limbus. Transillumination gave a deep shadow over the ciliary region as far back as the equator. The eye was enucleated with a portion of the optic nerve, but no masses were felt in the orbital cavity. After dividing the eyeball it was found that the whole region of the ciliary body was occupied by a flat black mass which ceased irregularly between the equator and the ora serrata, except at one point where the mass extended back near to the optic nerve. Microscopically the mass was a pigmented structure which only occasionally permitted the recognition of anatomic detail. It was made up of spindle cells in characteristically interlacing bands and invaded principally the uvea.

H. G. G.

Operations for Cataract Upon the Eyes of the Very Aged.

KEIPER, GEORGE F., Lafayette, Ind. (*Amer. Jour. of Ophthalmology*, November, 1911), means by the very aged, patients who are over 90 years old. He recommends in addition to the usual preparation, a very careful examination of the eye to determine the kind of cataract, the light sense and the field of vision, the latter by means of two candles, one of which

is used for fixation, and a very thorough bodily and mental examination. Then a preliminary iridectomy, followed by the extraction later, if the behavior of the patient is good. After either operation the patient is to be kept upright as much as possible, and quiet, but cheerful and hopeful. The eye not operated on should not be bandaged. Asepsis must be rigid, as the resistance of the patient is below par as a rule.

M. L. F.

Intracapsular Extraction of the Cataractous Lens.

SATTLER, ROBERT (*Archives of Ophthalmology*, November, 1911), has operated upon fifty consecutive unselected cases of cataract which he claims have furnished him with the answers to the following queries: 1. Is delivery in capsule with Smith's technical execution desirable, and can it be made a practical substitute for, or replace the similar one of the linear method, while retaining in every particular the distinctive features (incision, iridectomy, etc.) of the latter? 2. If successfully accomplished, what are the complications during and after such an attempt, as compared with capsule laceration and expression of the older method and its complications and immediate and remote visual results? 3. An impartial comparison of a successful extraction with capsule opening and expression of one eye and a successful intracapsular on the other eye in the same subject. 4. How to gain a more accurate and practical knowledge to guide us in the selection of cases for which intracapsular removal is superior, and the uncommon cases for which it is alone justified or contraindicated.

To state concisely the final practical points first, that intracapsular extraction has its limitations, and that the calmest judgment must direct a disinterested and impartial choice in the selection of cases. Second, that rarefaction with brittleness of the zonula is a senile change long known and accepted, but that its easy rupture through certain pressure movements against the outside of the globe is possible, is a new fact and an important disclosure of the Smith method. The operation is selected by the writer from choice in those cases in which he can distinctly make out the presence of a swollen or rounded lens, with additional objective proof that the equatorial regions are not too angular. The age period

which he has found most favorable for delivery in capsule, with the conditions just mentioned present, was between fifty and sixty.
H. G. G.

The Advantages of a Preliminary Capsulotomy, Especially in Immature Cataracts.

SMITH, HOMER E. (*Archives of Ophthalmology*, January, 1912), makes a right angle incision through the anterior capsule of the lens by a specially devised knife needle and by a certain method of technic. He claims that the capsulotomy knife can be kept superlatively sharp, that ample space is given through the dilated pupil, and the point of the knife may be kept fully in view during the division of the capsule, and, furthermore, the operator has the satisfaction of knowing that this is perfectly performed. Only through the grossest carelessness can the suspensory ligament be ruptured or the lens dislocated, for it is held firmly in place by the pressure of the vitreous behind and the aqueous in front. The iris cannot be wounded by the instrument, and there can be no bleeding to obscure the operative field. The day after the capsulotomy the extraction proper is performed. This method he believes obviates the long delay often necessary in immature cataract, and the secondary operation is almost always avoided.

H. G. G.

The Surgery of Myopia.

VANDEGRIFT, GEORGE W., New York (*New York Medical Journal*, November 25, 1911), presents the following conclusions:

1. Ablatio lentis must not be done in myopia of less than sixteen diopters.
2. Success depends largely upon the youth of the patient and state of health of the eyeball.
3. Extensive degeneration of the tunics of the eye, particularly in the macular region, contraindicate operation.
4. Danger of detachment of the retina is only slightly, if at all, increased by operation.
5. Progress of myopia and macular disease is not necessarily checked.
6. Discission, single or multiple, in childhood; discission and linear extraction in adulthood; primary extraction after the lens nucleus has become sclerosed, are the operative pro-

cedures of choice. Within the borderlands, personal experience and judgment must decide.

7. With proper skill and caution, 70 per cent of permanent success is assured. M. L. F.

Strabismus in Infants and Young Children.

HELLER, ISAAC M., New York (*Medical Record*, December 9, 1911). Although many reasons have been assigned as the cause of squint in children, investigation shows that these are only contributing factors in many cases. A tendency to squint which is not at first very noticeable may be accentuated by a severe illness in which the child's muscular strength is lessened, the consequent relaxation rendering the squint more apparent. One exception to this is diphtheria, which causes a paralytic squint which seldom becomes permanent. Of the many theories regarding the cause of concomitant strabismus but three are worthy of notice. First, the short muscle theory, which regards internal squint as due to a short internus muscle, and a divergent squint as due to an overacting externus. This is disproved by the fact that the eyes move freely in all directions, that they may squint alternately, and when quiet are often straight, hence the many failures of tenotomy in such cases. Second, the refraction theory. It is now well known that convergent squint is usually accompanied by hypermetropia alone or in combination with astigmatism. A normal eye looking at an object twenty feet distant uses none of its accommodation, but when looking at an object thirteen inches distant, three diopters of accommodation are necessary, and as accommodation and convergence are inseparable, the interni are exerted to the equivalent of three diopters. A hyperope of three diopters must use his accommodation to that extent to see things at a distance of twenty feet, and his eyes are apt to converge even for distance. For reading ordinary type he must accommodate three diopters more, so that he is compelled to use six diopters of accommodation. On account of the unity of convergence and accommodation the eyes turn to a point six and two-thirds inches off, and pointing thus, receive a very imperfect image of an object thirteen inches away. In correcting this he unconsciously rotates the better eye until the macula is reached, and this causes an excess inward rotation of the squinting eye. While vision in each eye

is equal, the squint alternates until one eye becomes definitely fixed. Third, the fusion theory. According to Worth the fusion faculty is absent at birth. Convergence, however, is developed in the first months of life and goes on until the sixth year, and after that can be destroyed only by paralysis of the muscles. A squinting child is never too young to receive treatment. The writer mentions two cases, one eleven months, the other fifteen months, both of whom were wearing spectacles. There is nothing new in this, but sometimes it is well to go over well-trodden ground. O. W.

Two Cases of Embolism With Retention of Central Vision.

SNELL, ALBERT C., Rochester (*Ophthalmic Record*, October, 1911), reports these cases: A man 56 years old, stated that one week before consulting the writer he had noticed a sudden loss of vision in the right eye. He said he could see with this eye, but a blank area seemed to follow wherever he looked. Ophthalmoscopic examination showed the entire upper outer quadrant of the retina to be decidedly pale, the edges of the pale area being clearly defined against the healthy color of the unaffected retina. The vertical edges extended upward from the temporal edge of the disc, and the horizontal edge formed a nearly straight line outward, taking a slight curve upward beyond the macula. The central artery of the retina divided at the center of the disc into a single superior and a single inferior retinal artery. Both of these subdivided again into a single nasal and temporal branch. A cilioretinal artery was present. The superior temporal artery abruptly lost its blood column about a quarter disc diameter from the papilla. The artery was distinctly visible beyond this point and contained only some beads of blood. Vision was 20/20 with correcting lenses. The field, taken when first seen, three weeks later and again three and one-half months later, did not vary.

The second case was that of a woman, 25 years of age, who five days previously had noticed a sudden loss of vision in her right eye, which presented a typical picture of embolism of the central artery of the retina, and was pale throughout except for a small area extending from the temporal edge of the disc outward beyond the macula. This area was nourished by a cilioretinal artery and had retained its normal color. Vision in this eye was 20/30. The field had not varied in four months. The last examination showed vision to be 20/20.

The presence of the cilioretinal artery in both of these cases would account for the retention of perfect central vision.

O. W.

A New Muscle Resection Operation for Squint.

REESE, ROBERT G., New York (*New York Medical Journal*, January 13, 1912), describes the following operation of myectomy which he has performed on two hundred and fifty cases in the past ten years with satisfactory results. He has devised a forceps to assist him, and finds local anesthesia alone to be necessary in most cases. His description of the operation is as follows:

"The lids and brow are first washed with soap and the eye is irrigated with 4 per cent boric acid solution.

"For the external and internal rectus, make a vertical incision in the conjunctiva six millimeters from the corneoscleral margin, commencing at the level of the upper corneal border, and extending to the horizontal plane of the lower border.

"At the upper and lower limits of the incision just made, grasp the tissue anterior to the sclera with forceps and open with scissors, directing their point away from the muscle. This procedure allows the passage of the strabismus hook under the entire muscle.

"When the muscle is held on the hook, dissect all conjunctival and subconjunctival tissue back to the canthus, exposing the bare muscle completely.

"The lateral invaginations of Tenon's capsule, which are attached to the tendons of the ocular muscles, must be dissected free and clear.

"One blade of the resection forceps is then inserted beneath the muscle at a right angle to its course, so that the groove on the blade lies directly over the middle fibers of the muscle. Clamp the forceps to the last notch, and do not let its grasp include anything but muscle.

"Sever the muscle two millimeters from its scleral attachment, leaving a stump, so that the resected end can be sewed to its original insertion. Free the belly of the muscle from any scleral adhesions. Three sutures are necessary.

"Put the sutures in, commencing with the middle, which is a No. 3 braided silk with a needle on each end. Pass one needle through the scleral surface of the muscle posterior to the blade of the forceps and four millimeters back of the

point of resection, and one millimeter to the side of the groove on the forceps; then pass the other needle the same way, but to the other side of the groove, making a loop with the suture on the scleral surface of the muscle. As the needles pierce the muscle let them include the dissected edge of subconjunctival and conjunctival tissues.

"The two wing sutures are No. 5 silk with a single needle passed first through the upper and lower part of the dissected conjunctiva and episcleral tissues, including the superior and inferior border of the muscle, and slightly posterior to the loop made by the middle suture.

"Cut the muscle anterior to the sutures, leaving at least two millimeters in front of the loop.

"Insert the two needles attached to the middle suture two millimeters apart, through the center; and the other two needles through the upper and lower edges of the scleral stump. These needles should include the conjunctiva as they pass from behind forward.

"Tie the middle suture first, in a loop; and do not use a surgeon's knot, as it will not pull up well. The lateral sutures are next tied. No supplementary conjunctival sutures are necessary.

"The middle suture is removed in ten days, and the others can be taken out any time after forty-eight hours, or if left in they soon fall out.

"The eye operated upon only is bandaged and is dressed daily for five days, when boric acid bathing, three times a day, is ordered, and if the eye is not overcorrected, the correcting lenses are ordered for constant use. On the other hand, if there is an undercorrection, a mydriatic is used and the proper glass is worn constantly.

"The operation consists in resecting the muscle only, and not cutting out any of the other tissues of the eye. It is a myectomy, because in no degree of squint, however slight, will removing the tendinous portion of the muscle be sufficient."

M. L. F.

Intestinal Sepsis as an Etiologic Factor in Cardiovascular Disease and Associated Ocular Affections.

RISLEY, S. D., Philadelphia (*Ophthalmic Record*, November, 1911), reports the following cases to show that sometimes serious ocular disease in which there is no known re-

lationship to syphilis, tuberculosis, etc., may be due to toxic influences originating in the alimentary canal:

CASE 1.—A woman, aged 45, a chronic invalid with rapidly failing vision. There was concentric contraction of the fields, advanced atrophy in one eye and a general haze in the other. Veins large and dark, arteries small with gray borders. She had been constipated for years, had recently had attacks of diarrhea. The colon was large and impacted. Castor oil, high enemas and mechanical aid finally emptied this of a large quantity of offensive matter. Under careful diet, medication and abdominal massage her general health was restored and was apparently perfect several years later, but the atrophy of both optic nerves seemed complete. This was evidently a toxic neuroretinitis which could be attributed only to the impacted colon and the continued constipation.

CASE 2.—A woman, aged 68, who complained of rapidly failing vision. She had little pain, but had spells of vertigo and general weakness. Ophthalmoscopic examination showed a neuroretinitis rapidly advancing to atrophy on the left side. Careful examination resulted in the following diagnosis: Hypertrophy and dilatation of the heart, hypertension, chronic constipation, autointoxication, hemorrhoids. Her ocular trouble could be accounted for in no other way than that of autointoxication.

CASE 3.—A man, aged 51. Complained of impaired vision, faintness with tachycardia, vertigo, nervousness and hallucinations, constant headache and painful pressure at the vertex. Had been dyspeptic for many years, was in the habit of using calomel and soda for constipation.

Examination showed: O. D., V., — 6/30 with excentric fixation; O. S. (?) V., — 6/20 slowly, slightly excentric fixation. There was an absolute paracentral scotoma in the right eye with a relative scotoma in the left. Also concentric contraction of the fields for form in both eyes. In August, 1906, his right eye became blurred, and in January, 1911, the left eye was affected in the same manner. This was ascribed to a hemorrhage in the eyes and he was treated with potassium iodid and protiodid of mercury without obtaining relief. Ophthalmoscopic examination on June 1, 1911, showed a large area of retinochoroiditis with absorption patches in the macular region. Fine web-like opacities in the vitreous; fun-

dus red and fluffy; arteries normal but veins large, dark and wavy in the right eye. In the left the same general conditions were present, but the changes at the macula consisted of a maroon colored woolly area and a granular nest at the fovea. The vitreous was transparent but there was a faint haze in the retina. He was placed on a skimmed milk and stale bread diet, and directed to use sulphate of magnesia daily. Within a week he was much improved. He was then given a more generous diet and 1/100 gr. of mercury after each meal with a nux vomica tonic and sent to the seashore. Five weeks from the date first seen he reported freedom from headaches, vertigo and hallucination. There was also an improvement in vision. He had been a heavy eater and user of tobacco, and it is but fair to conclude that his general condition and ocular trouble were the result of an intestinal toxemia.

O. W.

Exophthalmos in Nephritis, With a Consideration of Its Etiology.

LEVISON, LOUIS A., Toledo, Ohio (*New York Medical Journal*, November 18, 1911), says that exophthalmos occurs in chronic nephritis to a much greater extent than has been supposed. The reported cases have been few and confined to the American literature. The diagnosis of exophthalmos is not always a simple matter as, in the absence of lid retraction, slight degrees of exophthalmos are very easily missed. There is no definite correlation between the various lid phenomena of Basedow's disease and exophthalmos. The position of the eyeball is not constant and is influenced by the contraction of the upper lid. Exophthalmos is absent in 23.2 per cent of cases of Basedow's disease. When present, it bears no relation to the severity of the disease.

M. L. F.

Three Cases of Ocular Tuberculosis.

ALT, ADOLF, St. Louis (*Amer. Jour. of Ophthalmology*, November, 1911), reports three cases, one of which was apparently a primary tuberculosis of the cornea, another presented the picture of phlyctenular keratitis with swollen and fluctuating cervical glands, in which the eye symptoms were secondary to a general infection, and the third seemed to be a double infection with hereditary syphilis and tuberculosis, resulting in first a parenchymatous keratitis and, some years

later, in scleritis and episcleritis. Tuberculin treatment produced an excellent result in the first and third cases, and a partially successful one in the second. M. L. F.

Ocular Manifestations Associated With Some Forms of Chronic Cyanosis.

HOLLOWAY, T. B., Philadelphia (*New York Medical Journal*, January 13, 1912), adds one more case to the few in which the eyes have been examined in cases of congenital heart disease. The patient was a boy, 3 years old, and was under observation for five months, during which time no decided change took place in the fundus. There was a distinct enlargement of the veins of the lids. No definite degree of exophthalmos could be said to be present, but the eyes seemed to be prominent, probably dependent upon the widening of the palpebral fissure as the result of his dyspnea, and possibly assisted by the engorgement of the orbital veins. The ocular conjunctival vessels were slightly distended and of a chocolate color. The palpebral conjunctiva, especially toward the margins of the lids, was purplish in color. The bluish tint of the sclera was exaggerated, but no pronounced discoloration of this structure was present. In each eye the media were clear and the fundus was darker than one would expect to find in a blond, but hardly as dark as one sees in a negro. The discs were oval, dusky red in color, and the edges, while blurred, were not completely obscured. Many fine vessels, not ordinarily observed, could be noted on the disc. The veins were enormously distended, extremely tortuous, and almost black in color, and all of the larger branches presented a pronounced reflex stripe. The arteries were also somewhat darker in color, larger in caliber and more tortuous than normal, but here the changes were very much less marked than in the veins. No free hemorrhages or exudates were observed. M. L. F.

A Case of Amblyopia Due to the Ingestion of One Hundred and Twenty Grains of Quinin Sulphate.

KEIPER, GEORGE F., Lafayette, Ind. (*Ophthalmic Record*, October, 1911), reports the case of a man, aged 75, a heavy drinker and smoker. On November 12, 1905, he took 120 grains of quinin sulphate and became blind the next morning. Was given strychnia sulphate by the mouth and hypodermic-

ally. Was seen by the writer eight days later. Vision was then 20/200 in each eye. Pupils refused to react to light or accommodation. Fields of vision, taken by hand, were contracted to form and color. The ophthalmoscope showed paleness of the optic nerve heads and contraction of the retinal vessels. The macular regions were pale and the left retina showed a spot of retinitis below and to the left of the disc. Was sent to an hospital and given strychnia as before and also ten grains of capsicum every four hours to counteract his taste for tobacco. He left the hospital about one month later. Vision was then, O. D., 20/100, and O. S., 15/200. Both optic discs appeared atrophic and the smaller retinal vessels were absent. He was directed to continue treatment and report for observation. Four months later vision of the right eye was 20/40 and in the left was 20/200, both being considerably improved by glasses.

One of the most interesting features of this case was the age of the patient, as it exceeded that of any other similar case on record.

O. W.

Noguchi's Cutaneous Luetin Reaction and Its Application in Ophthalmology.

COHEN, MARTIN (*Archives of Ophthalmology*, January, 1912), concludes that the luetin test, which is performed by injecting intradermatically a sterile emulsion containing killed spirochetæ pallidæ obtained from pure culture, will probably prove to be a valuable aid in the diagnosis of syphilis. Thus far the test has been absolutely harmless in 170 cases which were inoculated during the last five months, there having been no reactions in 94 per cent of cases considered nonsyphilitic, and only mild and atypical reactions in the remaining 6 per cent, the test appears to be of considerable negative value. In 76% per cent of the ophthalmologic cases in which the test was performed, it conformed either with the clinical evidence and the Wassermann reaction together, or with one of these factors of comparison separately. It may, therefore, be concluded, even in the present experimental stage of the study of the luetin test, that a positive reaction is strongly presumptive evidence of the existence of syphilis. It is anticipated that with more active luetin and improvement in its method of preparation the above mentioned percentage con-

formity will be much higher. The luetin test was positive in ten cases regarded clinically as syphilitic in which, presumably because of previous antisyphilitic treatment, the Wassermann was negative.

H. G. G.

The Antiseptic and Germicidal Properties of the Silver Salts and Preparations.

PITZMAN, MARSH. St. Louis (*American Journal of Ophthalmology*, January, 1912), has found by his experimental researches that preparations of silver albuminates are to be divided into two classes; first, those in which silver albuminates are present without free excess of silver nitrate; second, those in which an excess of silver nitrate is present. To the first class belong collargol and argyrol, good antiseptics, but poor germicides; to the second belong protargol, ichthargan, albargin, and novargan, which are strong germicides, but have little if any practical advantage over the simple dilutions of the silver salts. The second class can be substituted clinically for dilute solutions of silver nitrate in ophthalmia neonatorum without loss of power or gain, the author is convinced, but callargol and argyrol cannot be substituted in the same way because the conditions call for an active germicide. He says with regard to literature: "Regard with the greatest suspicion antiseptic and germicidal values drawn on the gonococcus. This organism must live on human secretions—is too sensitive for such work as it dies off in culture without apparent cause. Honest work is often rendered valueless, the error constantly recurring, as silver is allowed to come into reaction with common salt, resulting in the formation of silver chlorid, which is insoluble and has no antiseptic or germicidal power."

M. L. F.

ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

(GREAT BRITAIN AND THE ENGLISH COLONIES.)

BY

WALTER R. PARKER, M. D.,

DETROIT.

WM. EVANS BRUNER, M. D.,

CLEVELAND.

NELSON M. BLACK, M. D.,

MILWAUKEE.

EDGAR S. THOMSON, M. D.,

NEW YORK.

AND

W. GORDON M. BYERS, M. D.,

MONTREAL.

On the Treatment of Syphilis by Salvarsan.

LIEVEN, W. A. (*The Ophthalmoscope*, January, 1912). The treatment of syphilis by salvarsan is discussed in an address based upon the literature on the subject, which the writer endeavored to bring up to date, his personal experience at Aix-La-Chapelle, and certain of his private cases.

The most generally recognized procedures for preparing the solution are described.

For intramuscular injection Alt's alkaline solution is the most effective and the most convenient, as has lately been emphasized by Ehrlich himself. The process of making the solution is as follows:

Into a graduated glass cylinder of 100 ccm. capacity, 10 ccm.

of sterilized water is poured and the salvarsan powder added. On brisk shaking, a clear solution results. Next is added to each decigramme of the powder 5 decigrammes of a normal solution of caustic soda. The whole is then shaken again for a minute. At first there results a cloudiness due to a partial precipitation, which, however, clears on further shaking; but if the clearing should be incomplete, it can be effected by the careful addition of a few more drops of the caustic soda.

The intramuscular injection should be given into the upper-outer quadrant of the buttock, so as to avoid the larger veins.

For the intravenous injection, 10 to 20 cm. of water or saline is poured into a cylinder of 200 cm. capacity. The salvarsan is added and shaken as before, until the solution becomes perfectly clear. Then is added physiologic saline to bring the total quantity up to 100 cm. To each decigramme of the powder is added 7 decigrammes of the normal caustic soda solution and shaken until any precipitate is redissolved, any incompleteness in this respect yielding, as in the former case, to the addition of a few more drops of the normal caustic soda solution. Finally, by filling up the cylinder with physiologic saline to a total quantity of 250 cm., the solution is ready for use. The saline must be at a temperature of at least 120° F. in order to bring the final solution approximately up to blood heat, and it is hardly necessary to say that all vessels and solutions must be scrupulously sterilized.

For the intravenous injection the apparatus constructed by E. R. W. Frank is described. On a stand, about one meter in height, are secured two graduated glass vessels, each of a capacity of 250 cm., one containing physiologic saline and the other the salvarsan solution. A tube from each leads to a two-way cock, with an effluent tube carrying the canula at its other end, and having interposed within a few inches of the canula, a short length of glass tube. By means of the two-way cock fluid can be passed from either vessel at will.

The tube and canula being first filled with saline, the canula is thrust into a vein without any dissection, the vein being first made prominent by a constricting bandage on the upper arm. If the vein has been properly tapped, blood will show in the glass segment above the canula. After the removal of the bandage, some 10 to 20 cm. of saline is allowed to pass into the vein. If this produces any swelling the canula must be

removed, as it is clear that either the canula has slipped or has transixed the vein, and it must be reinserted. Only after assurance that the fluid is entering the vein may the tap be turned and the salvarsan solution allowed to pass. After the desired quantity has been introduced, the tap must be turned, and again a few ccm. of saline let in, for on no account must salvarsan be allowed to extravasate into the subcutaneous areolar tissue.

The arsenic is excreted within a period varying with the method employed. After intramuscular injections it has been found six to nine months later. After intravenous, it has been found to be completely excreted in from five days to three months.

Some inflammation is almost invariably set up at the site of the intramuscular injection, and this inflammation has a tendency to produce necrosis. In the muscular tissue this process usually terminates in absorption, and extension of the necrotic process to the surface is not uncommon, and this even after the lapse of three months or more. (Braatz.)

In only two cases can the cause of death be ascribed to the drug itself. One, which Ehrlich himself acknowledges, died of fatty degeneration of the liver and nephritis, the other was a similar case of Mohr's. In all other cases the cause of the fatality lay in the wrong choice of cases. They were cases of cardiac lesion, general weakness, or far advanced disease of the brain. The fact that with the intramuscular injection poisonous arsenical compounds may sometimes arise, has led the writer to abandon this form of application.

Rigor, nausea, headache and diarrhea are reported to follow the intravenous injection the same day, usually after a few hours. The temperature goes up at times to 104°. The whole reaction runs its course in from five to six hours.

While a healthy heart is not injured by one or two injections, care is always advisable, as cardiac weakness and cardiac defects constitute important contraindications. An explanation of this is probably that the blood pressure regularly falls after intravenous injections.

Benario (Ehrlich's collaborator) compiled 130 cases of affection of the nerves. In 49 per cent of the cases, the auditory nerve, and in 43 per cent the optic nerve was affected. The other cerebral nerves, among which the facial, oculo-

motor and trochlear are mentioned, were much less often affected.

Clinical experiences have not confirmed this, for while the atrophy of the nerves after atoxyl continued without remission, the use of Hg. and KI, or any further use of salvarsan was successful, with the exception of Finger's case, in causing the manifestations to die away, so that today the fact seems established that the explanation is a genuine recurrence of syphilis after salvarsan. It is quite as certain, that with the salvarsan treatment such relapses of the nerves are much more frequent than formerly. A great many authors, therefore, accept the fact that the nerve fibers are weakened through the arsenobenzol, and a "locus resistantiæ minoris" is thereby produced in which the spirochete can develop.

Ehrlich also believes that as regards these neurorelapses, it is because in the narrow bone canals, in which the cerebral nerves pass, spirochetæ can escape the influence of salvarsan on account of there being only a small supply of blood.

Since the combination of intravenous injection with mercurial treatment, which method is advocated by Ehrlich himself, the frequency of neurorelapses have diminished remarkably. The mercury seems to be able to penetrate to those microbes that have managed to escape the salvarsan in the blood stream.

In most cases manifestations disappear more quickly than with treatment of Hg. and K. I. There would seem to be a special efficacy of "606" in those cases where Hg. and K. I. fail altogether, or are followed by frequent relapses. Salvarsan has its triumphs in dealing with malignant syphilis, whose characteristic feature is the failure of Hg. and K. I., which instead of doing good, simply weaken the patient and aggravate the symptoms. Here, usually, after salvarsan a complete change in the general condition of the patient sets in. He increases in weight and the manifestations yield to the drug sometimes in a miraculous way. By no other means can we obtain the same change of metabolism. For none of the different kinds of dietetic and hygienic measures which are used to strengthen the patient, and even the Zittmann (sarsaparilla) treatment, though often giving good results, are comparable with those really splendid cures obtained by "606." On the whole, specific nerve lesions yield better to salvarsan, especially specific meningitis and gummata of the brain.

The treatment of lues and metalues of the nervous system has not yielded as good results. In tabes, material results, even in the early stages, have seldom been obtained. The superiority of salvarsan over mercurial therapy with regard to the Wassermann reaction is not acknowledged. The observations of Scholz in Königsberg, that one subcutaneous injection of 0.4 to 0.7 gramme in recent secondary syphilis is hardly ever followed by complete disappearance of the disease; and that almost 50 per cent of the relapses occur in from six to eight weeks after the injection, are confirmed by the writer.

The relapses have a special importance in the eye and the nervous system. Whereas formerly the relapse of early syphilis of the eye, specific iritis, was at any rate a rare occurrence, now nearly all authors who have greater experience report relapses of the eye and ear. Buschke, Wechselmann, and Cohen more frequently saw iritis; Kowalewski observed neuritis optica two months after injection. Fisher saw among eight relapses no less than five grave cases of eye disease. Beck noticed two grave cases of disease of the vestibular and cochlear apparatus, seven to nine weeks after injection. Rille, three cases of grave affection of the labyrinth, four, ten and one-half and twelve and one-half weeks after salvarsan.

Salvarsan has, according to universal experience, a chance only where it can come by the blood stream into direct contact with the spirochete. But the spirochetæ are only to be found in the blood stream during a relatively short period, perhaps during the first three months, after which they become almost exclusively inhabitants of the glands and the connective tissue. Around the localization the organism responds with reactive products, by which a sort of capsule is formed. This prevents the salvarsan from affecting the parasite. Thus does Ehrlich account for the failure of the remedy on the feebly vascularized cerebral nerves, and so also is the defective action on the glands accounted for.

Ehrlich himself acknowledges that the absolute "sterilization magna" has not up to the present time been attained, and that salvarsan must not be prescribed without the other syphilitic remedies.

The writer lays down the following indications for treatment: "In any case, an intravenous injection, combined with mercurial inunction, is to be recommended for fresh primary

sores which are not yet become indurated, combined, if possible, with excision of the chancre. If induration has already supervened, or if secondary manifestations already exist, then I see no indication for treatment by "606" in ordinary cases, as then I would prefer to obtain a cure and a negative Wassermann equally without salvarsan, but by inunction only—that is, by a much less differential remedy. If one is not successful in obtaining the negative Wassermann, or if the case inclines to relapses, then I would combine Hg. and iodid with an injection of 0.3 gramme of salvarsan, at the beginning and end of the inunction cure."

This holds good alike for the secondary as well as the tertiary periods. The failure of the old specifics is a strict indication for treatment by arsenobenzol, but I lay stress on the fact that these are exceptions. As regards the eye, for specific iritis, which does not promptly yield to energetic treatment by inunctions or calomel injections, salvarsan may be highly recommended. In optic neuritis and other affections of the fundus it may be tried, as ill effects on the nerve need hardly be feared, provided that the drug be given by the intravenous method.

With malignant syphilis and in those very few cases where there exists an idiosyncrasy against mercury in every form, salvarsan is indicated in all circumstances. It will then often enough be found that after the improvement of the general health the tolerance of mercury again becomes greater. I should like here again to insist upon the point that the wonderful effect upon malignant lues does not in any way prove the superiority of salvarsan over the other specifics. Arsenobenzol attacks the spirochete much more evidently from another side. Sarsaparilla is almost worthless for ordinary syphilis, whilst it often works wonders in malignant and grave cases. It is not so much a question of the quantitative as the qualitative difference of the curative effect.

In acute syphilis of the central nervous system salvarsan is to be avoided, as the reaction may prove fatal. In chronic cases it is advisable. In tabes, one injection may be tried in cases at a quite early stage. In those cases where commencing general paralysis is diagnosed, it ought to be recommended under all circumstances, having regard to the uncertainty of diagnosis as between general paralysis and syphilis, and espe-

cially when the first infection dates back no farther than ten years.

According to my judgment, in the consideration of methods, the intravenous need only be taken into account, as it does not create any difficulties worth mention, and is far more undifferentiated, and at the same time efficacious, than the subcutaneous and intramuscular injection.

The following may be regarded as all-important contraindications: Syphilitic aortic incompetence, uncompensated heart lesions, myocarditis, brachycardia, aneurism, long-standing tabes, tabetic optic atrophy, chronic nephritis, diabetes, and old age.

W. R. P.

Leber's Disease and Allied Conditions.

CARGILL, L. VERNON (*The Ophthalmoscope*, February, 1912). After giving an historical review of Leber's disease the author presents a summary of Mendel's rules on heredity, defining certain terms used when discussing hereditary affection, and follows with a description of a typical case of Leber's disease. Fifty-five cases in sixteen families have been reported by the author.

Leber's disease or hereditary optic neuritis or hereditary optic atrophy is defined as an affection of the papillomacular bundle of neurones evidenced by a central scotoma, and terminating in more or less partial atrophy. Both eyes are usually affected and generally at the same time. Liability to the disease is hereditary, occurring most frequently in males, and is transmitted by unaffected females.

First described by Theodore Leber in 1871, "Ueber hereditäre und angelegte Schnervenleiden" (*Archiv. für Ophthal.*), when he recorded eighteen cases in five families, and later in 1877 (*Graefe-Saemisch Handbuch*, Bd. V), he added others, amounting to fifty-five cases in sixteen families. Later contributions were made by S. H. Habershon in 1887 (*Trans. Ophthal. Soc. U. K.*, Vol. VIII): Hornmuth, 1900 (*Beitr. zur Augenheilk.*, Bd. LXXXIX, Heft. XLII): W. I. Hancock, 1908 (*Royal London Ophthalmic Hospital Reports*, Vol. XVII): Edward Nettleship, Bowman Lecture for 1909 (*Trans. Ophthal. Soc. U. K.*, Vol. XXIX). Nettleship collected in all 180 separate cases.

The author claims we owe the "clinical elucidation" of the disease to the ophthalmoscope and a renewed interest in

it to the resuscitation of Mendel's rules on heredity. For history and details of recent work on this subject, the reader is referred to the discussion on "The Influence of Heredity on Disease" (*Proceedings of the Royal Society of Medicine*, Vol. II, Pt. 1) and to books on Mendelism by Bateson and Punnett respectively.

The author defines the terms used in discussing hereditary affections and follows with a brief statement of the principles of Mendelism, together with a summarization of the rules as laid down by Mendel.

Leber's disease is an example of a so-called "sex limited" inheritance, resembling in that peculiarity color blindness, the transmission being through apparently normal females, but usually affecting males.

The Mendelian laws are seldom clearly and fully demonstrated in human beings, as the numbers in a childship are so comparatively few, the ascertained genealogical trees so short and imperfect, and the surrounding circumstances so uncertain. It is very different from the data which can be obtained and the inferences which can be drawn from well planned botanical cultivation or animal breeding.

It has been suggested that men are, on the whole, more liable to inborn defects and diseases than women, and especially to those that affect the organs of special sense.

Nettleship (*Trans. Ophth. Society, U. K.*, Vol. XXIX, Ch. 12) from the analysis of his collected cases, comes to the following conclusions about Leber's disease:

An affected male seldom transmits the disease.

An affected female has usually had normal parents.

An affected female transmits to her children of either sex in larger proportion than if she carried the liability latent, but some of her sons usually escape.

Consanguinity is rare in Leber's disease, and the only risk from it is where an affected male marries a cousin who carries a latent liability, inherited either from her affected father, or, through her mother, from an affected ancestor.

The pathogenesis of Leber's disease is obscure, but the predisposing cause must be an inherited neuropathic tendency, and we must suppose that the macular neurones have an inherited defect in their vital resistance or a defective metabolic energy.

The neuropathic tendency is shown by the relationship which appears to exist between Leber's disease and epilepsy; and an unstable biochemic state is evidenced by the high infant mortality occurring in some of the reported families, especially among the male children.

The exciting cause may be some toxic condition affecting the innately unstable macular ganglionic neurones. This toxemia may be of endogenous origin, and in some cases connected with the sexual functions, seeing that the disease is most common soon after puberty, and that exhaustion of the sexual organs is liable to produce optic nerve derangements. It apparently has no association with syphilis.

The pathology is still uncertain. The names "optic neuritis" and "optic atrophy" lead to the presumption that the disease is one of primary inflammation of the optic nerves succeeded by atrophy, the retina being unaffected. Recent researches in neurology and on certain toxic amblyopia, to which Leber's disease is comparable, has shed a new light on the pathology of many cases of so-called retrobulbar neuritis, and point to the primary lesion being in the retina. The degeneration and atrophy under these circumstances would be ascending and not descending. The reason for the macular neurones being especially affected can be explained, according to the author, by their later development and higher specialization, each macular ganglion cell being connected with a single cone-bipolar distally and not with several, as in peripheral parts of the retina. This higher specialization and perfection implies diminished resistance to noxious influences, so that the macular neurones are the first to be affected and the last to recover. Assuming this hypothesis to be true, the author suggests that Leber's disease should be termed hereditary central retinitis.

After describing a typical clinical picture of Leber's disease the author speaks of the following typical borderland varieties which resemble Leber's disease in being examples of a special family vulnerability of the optic nerves, but differ in that the whole nerve is involved, resulting in general atrophy:

1. Infantile optic atrophy.
2. Cases of peripherally contracted fields associated with central scotomata.
3. Cases of moderate smokers of the same family, both

eyes affected. No improvement following discontinuance of tobacco.

4. Optic atrophy following sexual excess.

A diagnosis must be made between Leber's disease and retrobulbar neuritis, toxic amblyopia, optic atrophy associated with disseminated sclerosis, general paralysis, tabes or Friedreich's ataxia.

While the duration of the disease is to be counted in months, a good recovery is not impossible or even very improbable. The sight, as a rule, remains stationary after the rather rapid initial onset, and improvement may be delayed one, two or even three years.

Treatment has little or no effect. Prolonged rest should be advised, and the usual treatment for optic atrophy may be given.

W. R. P.

Leukemic Affections of the Eye, With an Account of a Peculiar Case.

HUDSON, A. C. (*The Royal London Ophthalmic Hospital Reports*, September, 1911) reports in detail a case of leukemia. The special points of interest in the case consisted in the development in a case which was clinically one of myelogenous leukemia, of tumors in the conjunctiva and skin, the histologic characters of these formations, the presence of fundus changes and the profound changes of rapid development in the characters of the white cells of the blood, associated with an acute progress and fatal termination of the disease. After reviewing in chronologic order the important literature of the ocular changes in leukemia, he summarizes the present state of knowledge with regard to fundus changes in this disease as follows:

"Changes are met with in both lymphatic and myelogenous leukemia, and in both chronic and acute cases; they are, however, by no means constant, being found, according to Leber, in only one-third or one-quarter of all cases. Both eyes are almost always affected, but not always in equal degree. The changes are, in some cases, limited to the appearance of scattered hemorrhages, such as were met with in our case, while preretinal hemorrhage may also occur; in other cases, however, more characteristic features are present, consisting in a light yellowish hue of the whole eyeground; distension and

tortuosity of the retinal vessels, affecting more especially the veins, which are of rose tint, while the blood stream in the arteries is abnormally pale; pallor and indistinctness of the optic disc, with a diffuse haze, involving the whole retina, and often more pronounced in the course of the main veins. The veins may be bordered by white bands, while hemorrhages are found scattered through the retina, together with white spots which, according to many authors, are more numerous in the periphery of the fundus, so that they may be invisible to ophthalmoscopic examination. Such spots are also met with in the macula; they are not infrequently surrounded by a red border, and may exhibit a definite prominence. Movement of the blood stream in the veins has been observed ophthalmoscopically. It would seem that in the acute cases fundus changes of hemorrhagic and edematous origin tend to dominate the picture, while the more characteristic fundus changes have been observed in chronic cases." Leukemia may be associated with vitreous hemorrhages, optic atrophy, optic neuritis and also thrombosis of the central vein of the retina. Leukemic infiltration of the orbit was first noted in 1875, and cases have been reported with the lids and the lacrimal glands the seat of tumors. As a result of the infiltration of the orbital tissue there may be limitation of movements of the eye. Leukemic tumors of the bulbar conjunctiva have rarely been noted.

Further remarks follow upon other lesions of leukemia and upon its pathology and the condition of the blood, details of which can better be found by reference to the original article.

W. E. B.

Injury to the Vitreous Body as a Factor in the Production of Secondary Glaucoma.

HUDSON, A. C. (*The Royal London Ophthalmic Hospital Reports*, September, 1911). The first series of cases is of glaucoma consequent on complete backward dislocation of the lens. Five cases are cited with macroscopic and microscopic appearances of the eye. The anatomic findings in these cases afford evidence that injury to the vitreous body, associated with complete backward dislocation of the lens, may lead to increased intraocular tension in more ways than one; firstly, from passage forwards of the vitreous into the anterior chamber, and consequent obstruction of the channels of exit at its

angle and the iris crypts; secondly, from direct forward pressure of the vitreous on the iris, and consequent closure of the chamber angle by the iris root; thirdly, from an accentuation of such forward movement of the iris by overdistension of the posterior chamber as the result of ballooning of vitreous through the pupil, and consequent interference with the perfectly free passage of fluid from posterior to anterior chamber; and fourthly, as the result of vitreous which has passed into the anterior chamber affording a scaffolding for the growth of endothelium of the ligamentum pectinatum, and the subsequent deposition of impervious hyaline membranes which obstruct the passage of aqueous to the spaces of the ligamentum pectinatum.

Glaucoma associated with subluxation of the lens constitutes his second group. Several cases are cited, and the author concludes that in this type of cases the glaucoma had resulted from obstruction of the angle of the anterior chamber by the root of the iris as a result of the forward movement of the latter. That the vitreous hernia between iris and dislocated lens had been an important factor in the production of this forward movement of the iris can scarcely be doubted.

His third group is glaucoma consequent on discission of capsular membrane. The diversity of opinion as to the causation of glaucoma in these cases is probably to be accounted for by the fact that this condition may arise from a variety of causes. Thus there can be little doubt that it may result from an iridocyclitis set up or aggravated by traction on the ciliary process. In the majority of cases, however, the accident is probably to be referred to injury to the vitreous, resulting in its passage forward against the posterior surface of the iris or through the pupil. Cases of glaucoma arising in this way may be divided into two distinct classes in which the difference in the clinical signs is probably dependent on a corresponding difference in the rationale of the glaucoma production. Thus it is probable that those cases which are associated with a deep anterior chamber and flat iris are to be explained as the result of passage forwards of vitreous into the anterior chamber, which, by obstructing the excretory channel and so interfering with the normal excretion of fluid, may give rise to increase of tension. It is probable that the liability of the vitreous to pass into the anterior chamber is in-

creased by an abnormal fluidity. On the other hand, it is likely that the more consistent the vitreous tissue the greater will be the disturbance caused by its presence in the angle of the anterior chamber. It is not unlikely that in some cases where free dissection has been made the vitreous may by its passage forwards exert a forward pressure on the iris and thus give rise to a narrowing or obstruction of the chamber angle, while it is probable that in these cases in which the glaucomatous attack is associated with a bombé condition of the iris, the condition is to be attributed to a hernia-like protrusion of vitreous through the pupil which, by overlapping of or actual adhesion to the pupillary border, causes an obstruction to the perfectly free passage of fluid from posterior to anterior chamber and thus leads to overdistension of the former. Such a forward passage of vitreous would obviously be favored by evacuation of the aqueous at the time of operation. As regards treatment, a condition of glaucoma with deep anterior chamber dependent on obstruction to excretion of fluid from the anterior chamber, will afford an indication for the use of a myotic with a view to opening up the excretory channels. The persistence of glaucoma after such measures would be most suitably treated by an attempt to establish a leaking cicatrix by Herbert's sclerotomy.

When, on the other hand, the glaucoma is dependent on direct pressure forward of the iris by vitreous, or on a bombé iris consequent on obstruction of the pupil, an attempt may be made to relieve the condition by the use of a mydriatic. If this is not speedily successful it will be necessary in a case of bombé iris to establish a communication between the anterior and posterior chamber by use of an iris puncture or iridectomy.

An important point in the subject of the supervention of glaucoma after the dissection of after-cataract relates to prophylaxis, in view of the greater liability to the supervention of this complication afforded on the one hand by extensive laceration of the vitreous and on the other hand by evacuation of the anterior chamber. Any unnecessary laceration of the vitreous is strongly to be deprecated in view of the liability to the glaucomatous complication. On this account there is in the writer's opinion much in favor of the procedure of dividing any but the most delicate membranes with the

Ziegler knife, which is made to penetrate the membrane with extreme obliquity, insinuated between it and the most anterior part of the vitreous, and made to divide the former in a forward direction by a gentle sawing movement. The opening may be subsequently enlarged. The temptation to divide dense bands, when it is possible to make an efficient opening in a more delicately constituted area, must be rigorously foregone, as likely to lead not only to a disappointing result as regards vision, but also to serious complications, consequent on undue traction on the ciliary processes or laceration of the vitreous. An escape of aqueous is most efficiently safeguarded by an oblique entry of the discission instrument immediately behind the limbus.

W. E. B.

On Cases of Night-Blindness With Peculiar Conjunctival Changes in Children.

STEPHENSON, SYDNEY (*The Ophthalmoscope*, January, 1912) has given an interesting paper upon a curious condition of the ocular conjunctiva, commonly called epithelial xerosis (Saemisch) associated with night-blindness. It is not uncommon in the neighborhood of London, among the lower strata of society, particularly among the children of the poor-law schools and orphanages. It was found present in 1.87 per cent of 6209 presumably healthy children. It prevails in summer and autumn, and is seldom seen in the winter months.

The conjunctival changes are seldom seen except in that part of the ocular conjunctiva which is exposed when the lids are open, the so-called "interpalpebral zone." (E. Fuchs.) They usually affect both eyes, sometimes to an unequal extent. They occur as more or less triangular areas (often situated one on each side of the cornea), which are dry and look as if they had been bespattered with tiny particles of white foam. If the foam-like material be wiped away, it is reproduced within twenty-four or thirty-six hours after complete removal. The glistening, dry-looking plaques, if once seen, can scarcely be mistaken for anything else. The conjunctival patches are called "epithelial xerosis" (Saemisch).

The symptoms of night-blindness are often difficult to elicit in children; however, frequently there is a history of stumbling about in the twilight.

The relationship between conjunctival changes on the one

hand and night-blindness on the other is not invariable. The one symptom may occur without the other, and vice versa.

Changes in the visual fields were found to exist. These were of two kinds, viz., constant and inconstant. The former consisted in a reduction for the red and green fields. But that was not all, for the field for red was more shrunken than that for green, so that the former lay inside the latter; whereas, under normal conditions, the reverse should, of course, be the case. In three-fourths of the patients examined with reference to this point the transposition was complete, but in the other the two fields overlapped at one or more places. The second or inconstant change lay in a slight contraction of the limits of the field for white.

The so-called "light minimum," as estimated by Förster's photometer, was diminished in both conditions named. The obvious conclusion is that there exists a state of torpor retinae, but the condition of potential night-blindness is often not discovered on casual examination.

Both in simple xerosis and in xerosis complicated with night-blindness the fundus presented slight departures from normal. Thus, the retinal reflexes were exaggerated, so that the fundus looked paler than usual; while in addition a semi-circular, jagged reflex was often to be observed close to the inner side of the optic disc. These points, although under any circumstances somewhat intangible, were easier to appreciate when ophthalmoscopic examination was conducted under weak illumination with an undilated pupil.

To many of the cases the term "strumous" might fitly be applied. Such appearances as otorrhea, large tonsils, opacities of the cornea, eruptions about the face and ears, swollen upper lips, nasal catarrh, enlarged cervical glands, and synovitis of the larger joints were common among them.

Besides this, it was found that the children with xerosis conjunctivæ, with or without night-blindness, showed a deficiency in the hemoglobin content of the blood. With Gower's hemoglobinometer, the children affected showed an average of 65 per cent, while examination of the blood of 164 healthy children showed an average of 76.62 per cent hemoglobin, showing a condition akin to chlorosis, as determined by the blood to exist in these cases.

It is significant that xerosis and night-blindness should

occur only in poor-class children, and should make their appearance exclusively in spring, summer and autumn. The dazzling of sunlight appears to be the immediate cause, and it is doubtless intensified by the paving of York flags, which reflect an uncommon light in the eyes, and the reflection of the whitewashed walls.

The white patches are to be found only on that part of the conjunctiva which is exposed to light when the eyes are open. This suggests that under the influence of light, or of some of its elements, the metabolism of the exposed parts undergoes an alteration, and thus allows the xerosis bacillus, an almost constant inhabitant of the conjunctival sac, to lodge upon the parts and to multiply to an enormous extent. Particles of keratin and of keratohyalin are found pathologically in the altered epithelium, and this leads, as Stephen Mayou has pointed out, to an alteration in the surface tension of the affected areas, in consequence of which the oily secretion of the Meibomian glands collects upon them in the form of a white foam. The bacilli themselves play no part in the causation of the symptom complex.

Lastly, the remote cause is to be sought in some slight defect in nutrition, as indicated by the color index of the blood.

W. R. P.

Vaccine Therapy in Eye Disease.

BRYAN, C. W. G. (*The Ophthalmoscope*, December, 1911). The general treatment of disease by vaccine is entered into, and the results obtained in affections of the eye. Vaccine therapy concerns itself with the production of active immunity against bacterial disease. Active immunity can be acquired in two ways: (1) by autoinoculation by bacterial substances set free from some focus of disease, (2) by the methods of heteroinoculation, where a vaccine is prepared and administered to the diseased subject, usually being injected subcutaneously.

Autoinoculation is produced by disturbing the diseased area in some way, that is, by massage, movement, heat, etc.: an unsatisfactory method of producing immunity in diseases of the eye, owing to the limited blood and lymph supply.

In using vaccine it is necessary to prevent autoinoculation by keeping the diseased part at rest, for if autoinoculation takes place, bacterial substances of unknown amount may be

set free in the blood stream at unfavorable times, causing a variation of the dose of vaccine administered.

According to the dose of vaccine administered, four main effects can be produced, as shown by opsonic index curves:

1. If a small dose of vaccine be given, no effect on the index may be produced, although even in this case clinical benefit may result.

2. A dose which has only slight effect causes changes in the amount of opsonin in the blood—first, a rapid slight rise of the opsonic index, to be followed by a gradual fall to about the level at which it stood before inoculation. This is known as a "positive phase."

3. The usual effect aimed at is the production first of a "negative phase," that is, a fall of the opsonic index immediately following the inoculation. This should not last longer than about thirty-six hours, and should be succeeded by a positive phase of comparatively long duration.

4. If an overdose be given, a negative phase only may be produced, causing harm to the patient and possibly lasting for several weeks.

In treating acute disease we attempt, by giving small doses at short intervals, to produce only positive phases: but in chronic disease more benefit will result from the longer positive phase which follows a dose of vaccine which is large enough to produce a temporary negative phase: in fact, it is our aim to produce, by repeated injections, negative phases as short as possible, followed by positive phases as long as possible. As the negative phase passes off, the injection is repeated. In treatment of a disease for any length of time it is necessary to increase the dose of vaccine very gradually. The size of the dose and the length of the interval between successive inoculations vary with the nature of the disease and its bacteriology.

It has been found that clinical symptoms closely follow variations in the opsonic index, and in eye disease local signs and symptoms are especially valuable. On the whole, larger doses of vaccine are necessary in the treatment of intrinsic disease of the eye than are used in infections of other parts of the body, and there is less danger from the production of negative phases.

A case is cited of tuberculous conjunctivitis which made a

good recovery following tuberculin treatment over an extended period; an initial dose of 1/8000 mgrm. was given, and the dose was gradually increased to 1/2,000 mgrm. Another case, of interstitial keratitis, cleared with similar treatment after a period of five months. Some twenty cases of phlyctenular ophthalmia have been treated with tuberculin. An initial dose of 1/5,000—1/10,000 mgrm. was given. After a few doses the eyes became quiet. Errors of refraction in these cases must also be corrected.

Internal tuberculosis, either with localized lesions affecting various parts, usually iris or choroid, or with generalized disease involving the iris, ciliary body and choroid, require larger doses, and some excellent results have been obtained. The comparatively bad prognosis in these cases and the necessity for very prolonged treatment by large doses of tuberculin are due to the fact that the circulation of the internal parts of the eye is poor.

In most cases of disease due to pyogenic organisms it is possible and advisable to use a specific vaccine obtained from the diseased focus, but in diseases due to the staphylococcus, a stock vaccine is perfectly efficient in nearly all cases. In diseases of gonococcal origin, too, a stock vaccine must usually be used, owing to the difficulty of preparing a specific vaccine and to the usually acute course of the disease. In these cases a stock vaccine gives quite satisfactory results.

External Infections.—Acute inflammations of the lacrimal sac are usually due to streptococci, and are but little influenced by vaccine.

A case of chronic lacrimal sac inflammation due to pneumococcus was treated over a period of three months with vaccine, and cleared sufficiently to allow cataract extraction.

Vaccine treatment has given excellent results in chronic blepharitis, recurrent chalazions, hordeola, and a variety of recurrent conjunctivitis due to chronic inflammation of the Meibomian glands.

A striking benefit has been obtained in gonococcal ophthalmia by small doses of vaccine, repeated every forty-eight hours.

In corneal ulcers due to pneumococcus, success depends upon early treatment. Twenty-five millions of stock polyvalent vaccine should be given and a specific vaccine prepared

as rapidly as possible. Fifteen millions of this may then be injected, and the dose repeated in three days or so, the treatment being regulated by estimations of the opsonic index and by clinical appearances.

Cases of postoperative infection, rarely seen now, are eminently suited to vaccine treatment, and many eyes have been saved by this means.

W. R. P.

Three Cases of Gonorrheal Iritis Treated With Antigonococcal Serum.

BUTLER, T. HARRISON (*The Ophthalmoscope*, December, 1911). Three cases of gonorrheal iritis are reported, which were treated with antigonococcal serum. All cases had resisted the ordinary forms of treatment, such as atropin, hot fomentations, sodium salicylate, etc., had showed marked improvement after injection of the serum.

In case 1, two injections of 2 cc. each of Parke-Davis & Company's antigonococcal serum was followed by rapid complete recovery.

In case 2, the first two injections had a very pronounced effect upon the disease, but it did not appear to be lasting, for the left eye relapsed slightly and the right became inflamed. The last injection acted like a charm, the right pupil, which would not dilate at once, within twenty-four hours of the injection became fully dilated and the iritis rapidly lost its acute character. The second injection caused slight symptoms of serum disease, urticaria and some irritation of the skin.

In case 3, one injection was followed by a disappearance of symptoms. Antigonococcal serum being made from ram's blood, seems to be more likely to cause serum disease than the ordinary horse serum, and it is better to give both injections within a short interval and not to repeat the dose more than once.

W. R. P.

Fuchs' Coloboma and Astigmatism.

WORTON, A. S. (*The Ophthalmoscope*, December, 1911). The paper deals with a clinical study of 30 cases of Fuchs' coloboma or congenital inferior crescent, particularly as regards the relationship to true astigmatism. It has been thought that the gray or white crescent present below the disc really represents a minimal type of coloboma of the choroid.

Elsching, however, from anatomic and microscopic examin-

ation of three cases, found appearances practically indistinguishable from those seen in myopia, and regards them as produced more in the same way, viz., by stretching of the ocular tunics at the posterior pole and consequent pulling away of the choroid from the disc margin. This stretching he ascribes to some developmental weakness or want of consolidation of the tissues in the line of the fetal cleft, which permits of their giving away before the normal intraocular tension.

The macular area, although not directly involved in this stretching, may yet secondarily be affected from proximity to the weakened region below, and a condition of asymmetry may develop to which the term "fundal astigmatism" has been applied.

This macular distortion in typical cases doubtless accounts for the well-known fact that the visual acuity, despite correction, remains considerably below normal, although, on the other hand, it must be noted that in the less marked cases at least, as will be seen from those reported later, the condition is not incompatible with practically full vision.

Astigmatism was found to be present in greater or smaller degree in all the eyes affected, and in the large majority (63.6 per cent) was made up of combined corneal and lental astigmatism. In some (22.7 per cent) the astigmatism seemed to be wholly corneal, and in the remainder (13.6 per cent) wholly lental in character.

In those cases where both corneal and lental astigmatism co-existed in the same eye, the axes were found to be practically coincident, this probably pointing to a common source of origin. A careful comparison of the tabulated result shows a remarkable correspondence between the meridian of greater refraction, i. e., the more myopic or less hypermetropic, and the direction of fundal stretching.

In 63.6 per cent of the eyes affected, the direction of fundus stretching corresponds to a meridian of 110 and 90 in the right eye, and between 70 and 90 in the left, representing the usual direction of the fetal ocular cleft. The crescent may, however, be shifted in some cases, and occupy a nearly nasal position, and in one case the crescents were bilateral and superiorly situated.

Ophthalmoscopically, the disc proper in a typical case appears to be oval horizontally, because seen foreshortened in

the horizontal plane; the white or gray crescent apparently forming part of the disc area, is yet limited from it by a line representing the exposed margin of the sclerotic, which also encroaches to a greater or less extent on the fundus below.

The primary direction of the vessels is downward, the lower branches continuing thus, but the upper soon curve sharply upwards over the disc margin to gain the fundus. A very constant feature of all is the bleached or semialbinotic state of the fundus in its lower and inner part. This was observed in all cases, and probably owes its origin to some lack of pigmentation in the layer of hexagonal epithelium of the retina and attenuation of the choroid due to stretching.

Over this area some impairment of retinal function may be elicited in response to color tests. In five cases presented there was a flattening of the upper fields for green. A somewhat similar bleaching of the lower part of the fundus is often observed in cases where the rest of the fundus and discs remain otherwise normal. These cases are very often associated with astigmatism and probably represent a minor degree of the condition under discussion.

The correspondence observed between the axis of the meridian of greater refraction and the direction of fundal stretching would seem to justify the conclusion that they were closely related as to cause, and possibly throws light on the etiology of simple corneal astigmatism, which similarly may owe its origin to some stretching of the tissues filling up the anterior part of the fetal ocular cleft.

W. R. P.

What Are the Best Means to Adopt to Avoid the Spread of the Forms of Ophthalmia Which May Lead to Blindness?

MACCALLAN, A. F. (*The Ophthalmoscope*, December, 1911), discusses the tremendous amount of blindness in Egypt, the organization at present in existence for the prevention of blindness, and outlines a scheme for future developments.

The common causes of blindness in Egypt at the present time are acute ophthalmia, trachoma, and glaucoma.

Acute ophthalmias are a group of contagious diseases which have seasonal variations of virulence. The increase beginning with onset of warm weather in April and May, when the temperature has been reached at which the bacterial organisms multiply with enormous rapidity. Ophthalmias

diminish in the autumn and are rarely seen in winter. It is exceedingly hard to obtain reliable information on ophthalmia neonatorum as the cause of blindness, owing to the fear of the midwives that punitive measures will be taken against them if they admit having had cases among their clientele.

Trachoma is practically universal in Egypt, except the higher classes. It accompanies every other disease of the eye, except occasionally among very young children who have as yet escaped infection.

Glaucoma, a disease unaccompanied by the signs of inflammation, is probably more common in Egypt than in any other country in the world. It is probably the result of the hereditary transmission of such anatomic peculiarities as lead to the disease.

It is found that 21 per cent of the cases of blindness seen among 91,917 patients by the writer and his assistants from 1907 to 1910 were due to glaucoma. The number of blind people at the time of the census in 1907 was 148,280 or 1.3 per cent of the population. Those blind in one eye were estimated at 3.2 per cent of the population. These figures are probably much understated.

Trachoma and acute ophthalmias are allies in the destruction of sight in Egypt. The uncleanly habits of the lower classes, the crowded huts with crumbling mud walls, the dust of the streets, unpaved and unwatered, the gales of daily occurrence which drive the dust around, even into the most hermetically sealed houses, are all fertile causes of acute ophthalmias.

The organization at present in existence for the prevention of blindness consists of seven permanently built hospitals, maintained at a cost of £4,000 to £5,000, and in addition, two large traveling hospitals, which consist of ten large tents, which visit various large centers for six months at a time. Each of these hospitals treat on an average of 225 patients per day, the average number of operations performed is thirteen per day.

It is hoped that within ten years there will be in Egypt twelve permanent hospitals and two traveling hospitals, or one for each of the fourteen provinces. Even such a scheme is quite inefficient for the needs of the country. In each province there are, roughly, six police districts or merkazes,

each with an average population of 120,000 people, and even if there were a traveling hospital in each merkaze, it is calculated it would be twenty years before all the people with defective eyes could be seen. There should be in every police district a traveling hospital having as its base a permanent hospital in the capital town of the province. The clinical work at the traveling hospital would be mainly the treatment of trachoma and, in the summer weather, ophthalmias.

Two conditions must be laid down as essential to the success of such a scheme: one is the efficient training of the surgeons who carry on the clinical work, and the other is the efficient administrative and clinical control of the ophthalmic section of the public health department.

Preventive measures can never be applicable to Egypt, even in future ages, until the ocular disabilities of millions of Egyptians, remediable by simple operations or treatment, are relieved as the result of the establishment of hospitals all over the country. When the parent's eyes are exceedingly painful or defective, he or she will not appreciate any detail of ophthalmic prophylaxis on behalf of his child.

The detail of this scheme as outlined has been seriously considered and adopted as a workable policy by the public health department.

The ministry of education has been considering for some time the possibility of providing in the chief town of each province an institution for teaching the blind, as there are at present some 30,000 blind children in Egypt. There is one school at Zeitoun, where, besides a general education, a trade is taught, which in a certain number of cases enables the pupils to become selfsupporting.

W. R. P.

ABSTRACTS FROM GERMAN OPHTHALMIC
LITERATURE.

BY

WILLIAM ZENTMAYER, M. D.,

PHILADELPHIA.

ALBERT C. SAUTTER, M. D.,

PHILADELPHIA.

FREDERICK KRAUSS, M. D.,

PHILADELPHIA.

AND

WALDEMAR E. FISCHER, M. D.,

ST. LOUIS.

Studies With the Tonometer of Schiötz.

VAN GELDER, POLAK, Amsterdam (*Klin. Monatsbl. f. Augenheilkunde*, Vol. XLIX, November, 1911), after many experiments with the tonometer of Schiötz, concludes that in a quiet patient there is no difference in the ocular pressure, no matter which speculum is used to hold the eye open during the operation for cataract or glaucoma. Similarly the intraocular pressure is enormously increased if the patient pinches his eyes, irrespective of the kind of speculum used. Therefore, the speculum having a weak spring, which gives least discomfort to the patient, is to be chosen. Section of external canthus allows the operator more room, but the patient can raise the tension very high by straining. The author has found that introduction of a suture through the upper and lower lid muscles, held by an assistant,

has a marked effect on tension. The tonometer registers a normal pressure of 25 mm. mercury in an eye when the patient is quiet. The pressure will raise by strain to 35 or 40 mm. when the thread through the upper lid is tightly held. When the lower thread is held, the patient cannot with his utmost efforts raise the pressure above 27.5 mm. The thread must be introduced through the muscles of the lid at their attachment to the malar bone and held firmly by an assistant. Professor Straub makes use of this procedure with section of the external canthus in all cases of operation for cataract and glaucoma.

F. K.

Traumatic Conjunctivitis.

PFALZ, G., Düsseldorf (*Klin. Monatsbl. f. Augenheilkunde*, Vol. XLIX, November, 1911), believes that the chronic hyperemia following traumatic conjunctivitis is of no importance and will gradually disappear without leaving a tendency to reinfection. Traumatic conjunctivitis heals spontaneously in a few days. Continued inflammation is an evidence of infection. In burns of the conjunctiva of the third degree it is an error of technic to neglect transplantation. Astringents should never be used in burns of the first and second degree. They irritate and do no good. Prolonged treatment is apt to cause a treatment neurosis. If trachoma develops after a traumatic conjunctivitis, it is due to a previous infection.

F. K.

Concerning Congenital Ptosis With Heredity.

HUETTEMANN, Strassburg (*Gräfe's Archiv. fuer Ophthal.*, Vol. LXXX, Part 2), publishes his observations on congenital ptosis with epicanthus in three generations of a family. Two brothers who show this anomaly are illegitimate sons of a man similarly affected. One brother has four living children, three of which show this condition; one son and one daughter deceased were unaffected. The other brother has three living children, the anomaly being present in one daughter and one son. One deceased daughter was also afflicted. Excepting in one case, no disturbances of the other ocular muscles are present. The unaffected children in appearance strongly resemble the mothers. Examination of the electrical reactions in three cases suggest absence or imperfect development of the levator. The contribution includes a photographic copy of ten members of the family.

A. C. S.

The Anatomopathologic Condition of the Posterior Capsule in Senile Cataract.

MIHAIL, Bucharest (*Gracfe's Archiv. fuer Ophthalm.*, Vol. LXXX, Part 2), after referring to the literature and citing the results of his histologic studies, mentions the Manolescu operation as being the nearest approach to removal of the lens in capsule. A broad fold of the anterior capsule is seized with a toothless forceps, and in most cases it is then possible to extract the whole anterior capsule, the equatorial capsule, and even a portion of the posterior capsule. Secondary cataract is prevented by the removal of the productive equatorial zone of the posterior capsular epithelium. In 2,647 combined and simple extractions there were only 114 operations for secondary cataract necessary. A. C. S.

Concerning Hole and Cyst Formation in the Fovea Centralis.

ZEEMAN, W. P. C., Amsterdam (*Gracfe's Archiv. fuer Ophthalm.*, Vol. LXXX, Part 2), publishes the histologic findings in a case of hole formation at the fovea centralis and reviews the literature, arriving at the following conclusions:

1. A perifoveal retinal zone exists, which is especially susceptible to injurious agents.

2. This susceptibility is the result of especial vascularization.

3. The predisposition to cyst formation in the region of the fovea and ora serrata is an expression of this relatively deficient vascularization.

4. The most pronounced cyst formation occurs in the temporal half of the ora serrata, because of the greater distance here from the efferent central vessels.

5. Perifoveal lesions induced or favored by insufficient blood supply may lead to hole formation.

6. True hole formation at the fovea results either from a union of cystoid spaces or from rupture consequent to cicatricial contraction from the immediate vicinity. A. C. S.

On Pseudoneuritis and Other Differential Diagnostic Important Congenital Anomalies of the Optic Nerve.

SALZER, Munich (*Munch. med. W'och.*, December 19, 1911), concludes that in many cases because of congenital anomalies, simple changes, etc., it is impossible to diagnose

simple neuritis, beginning choked disc, and beginning optic atrophy from one ophthalmoscopic examination, explaining the contradictory conclusions of different authors regarding the frequency of optic nerve disease in the mentally diseased. To render the ophthalmoscopic diagnosis of value, numerous examinations supplemented by subjective tests are necessary.

A. C. S.

Salvarsan and Neurorecidives.

GOERLITZ, MARTIN, Hamburg (*Klin. Monatsbl. f. Augenhelkunde*, Vol. XLIX, November, 1911). Considerable debate has arisen regarding the nerve lesions seen in syphilis after the use of salvarsan, as to whether they are the result of the syphilis or a neurotropia of the arsenic preparation. The author reports a case of fresh syphilis in which after two successive intravenous injections of salvarsan the patient developed oculomotor palsy and neuroretinitis, four months after the original infection, with disappearance of all other syphilitic phenomena. Eight days after a third salvarsan injection there was slight improvement of the palsy. Under mercurial inunctions the palsy and neuroretinitis disappeared entirely. Goerlitz reviews the literature of the subject and believes that nerve symptoms are more common in early syphilis when salvarsan has been used, and that they are caused by an alteration of the disease whereby we have early manifestations of the late results of syphilis.

F. K.

Studies Regarding Affections of the Optic Nerve and Retina. On the Ophthalmic Signs in Tumor of the Pituitary Body and Their Variability.

DE KLEIJN, Utrecht (*Gräfe's Archiv. fuer Ophthal.*, Vol. LXXX, Part 2), summarizes the results of clinical investigations under the following headings:

I. The visual fields, the variations in the fields, vision and congestion.

(a) The extent of the field of vision (white and blue only recognized in the author's four cases) in tumor of the pituitary body may vary greatly from day to day without any treatment whatsoever. (b) The variations in either eye are not parallel, nor are the changes in the visual field in accord with the changes in vision. (c) The variations in the visual field are of great practical significance in estimating

a possible therapeutic result. Statements such as "improvement in vision and widening of the field followed the operation" are of no value. Hasty conclusions should not be drawn. The changes sometimes observed from vision to amaurosis and from amaurosis to vision may be the result of cystic new-formations, the rupturing of the cyst wall into the ventricle accounting for the return to vision. While these variations were observed in three of the author's cases, he is unable to state whether they are a rare or frequent complication of tumors of the pituitary body. Similar variations may accompany other processes involving the basal optic tracts. (d) The form of the visual field. Hemianopsia alternating with other types of field will probably be observed more frequently, if daily examinations are resorted to. (e) The island shape conformation of the field. Sometimes various islands occur in the blind part of the field, their position and number constantly changing. (f) In several cases the blue field was larger than the white field.

II. Blue vision.—Two patients complained of blue vision.

III. Hallucinations.—One patient, though her red field was practically nil, claimed she saw red balls of fire. He considers this probably caused by irritation of central tracts.

IV. Pupillary reaction.—In one case the reaction returned at the end of an attack of amaurosis, while the patient was still completely amaurotic, contributing further support to the teaching that in peripheral amaurosis a distinct reaction to light may occur in exceptional cases.

V. The frequency of choked disc.—No positive statements can be made; however choked disc seems to occur more often than commonly supposed. Simple atrophy apparently occurs more frequently than in other brain tumors.

VI. Operative therapy.—He advises against operation in cases without severe symptoms. In patients with symptoms of increased intracranial pressure he recommends palliative trephining or puncture. These proving ineffectual, Schloffer's or a modified Schloffer's operation should be performed, the patient and the patient's kin being informed of the risks attending the operation.

Where severe ocular disturbances exist, a puncture through the posterior wall of the sphenoidal sinus may be attempted, especially if the clinical symptoms suggest a cystic tumor formation.

A. C. S.

Critical Remarks Concerning Experimental Sympathetic Ophthalmia.

REIS, W., Bonn (*Klin. Monatsbl. f. Augenheilkunde*, Vol. XLIX, November, 1911), believes that the inflammations caused by Guillery in rabbits by injections of ferments into the vitreous were in reality not sympathetic inflammations as we see them in human beings. The latter is more properly a proliferating disease in contradistinction to the exudative symptoms of an endophthalmos. After a critical survey of the subject, Reis concludes that it has not been proved that an inflammation resembling sympathetic ophthalmia can be produced by ferment injections. Until more positive knowledge of a nonbacterial etiology of sympathetic ophthalmia can be elicited, it will be safe to continue to believe that it is of bacterial origin, as proved by the histologic findings. F. K.

The Presence of Adrenalin in the Blood Serum of Glaucomatous Patients.

KLECZKOWSKI, T., Krakau (*Klin. Monatsbl. f. Augenheilkunde*, Vol. XLIX, October, 1911). The connection between intraocular tension and blood pressure has been recognized for years. Kleczkowski examined thirteen cases of glaucoma, in eight of which there was an inflammatory glaucoma, three cases of glaucoma simplex, and one case of hemorrhagic glaucoma. The author tabulates his results and concludes that in all cases of glaucoma there is increased blood pressure. With increased intraocular pressure, inflammatory reaction may be entirely absent. In a case of hemorrhagic glaucoma, complicated with kidney disease, the blood pressure was very high, 170 mm. In all cases of glaucoma the presence of adrenalin in the blood could be easily demonstrated. Lastly, the presence of adrenalin in the blood serum is an indication of disease in the organism. The author believes that the adrenalin in the blood is operative upon the entire system, thus affecting the pupil, causing dilatation which, with increased blood pressure, produces glaucoma. F. K.

On the Question Regarding the Histologic and Etiologic Character of Sympathetic Inflammation.

REIS, W., Bonn (*Gräfe's Archiv. fuer Ophthal.*, Vol. LXXX, Part 1). In a long article, supplemented by case

histories, Reis advances views upholding the microbic origin of sympathetic inflammation.

He attacks the stand taken by Guillery, who was able to produce a chronic round cell inflammation of the uvea by the action of various ferments, concluding that ferment action of this type must bear a close relation to the processes occurring in sympathetic inflammation. Reis claims that localized lymphocytic infiltration of the uvea is not characteristic of sympathetic inflammation alone, but may follow irritation of various sorts. Neither can he accept Elschmig's theory, attributing the condition not to bacterial agents but to the anaphylactic reaction of the hypersusceptible uveal tissue to an anomalous diseased state of the organism.

Reis joins those who see in the histologic picture of sympathetic inflammation proof of the localization of a specific living virus. He reports several case histories with pathologic findings which contribute further evidence in favor of the endogenous theory advanced by Meller.

I. A case of sarcoma of the choroid followed by sympathetic inflammation.—Histologic examination of the exciting eye disclosed characteristic foci in the posterior portions of the globe favoring deposition of bacteria from the blood channels.

II. A case of sympathizing inflammation preceding inflammation in the exciting eye.—Perforating wound of the anterior ocular segment. Good wound closure. Seven weeks later symptoms of sympathetic inflammation in the fellow eye. Injured eye quiet, vision, 6/18—. Three days later this eye, too, became inflamed. Virulent course in both eyes. Enucleation of injured eye. Phthisis bulbi, amaurosis in the fellow eye.

Microscopic examination showed the characteristic inflammation in the posterior portions of the globe. He suggests an endogenous infection of both eyes from a common source. Because of the traumatism the injured eye became a locus minoris resistentiae, exerting a localizing influence on the other eye perhaps through the vasomotor centers. (Schmidt-Rimpler.)

III. The incipient (?) stages of sympathetic inflammation.—In one case there was a perforating wound of the cornea caused by the entrance of a steel particle. Extraction of the

fragment. Five weeks later symptoms of sympathetic irritation in the fellow eye. Enucleation of injured eye followed by subsidence of irritation. Histologic examination showed slight chronic inflammatory changes in the posterior bulbar portions, the imperfect development of the histologic findings, though thirty-five days had elapsed since the traumatism, suggesting endogenous infection.

In conclusion, he again emphasizes the fact that circumscribed lymphocytic infiltrations of the uvea cannot be considered pathognomonic of sympathetic inflammation—that for the present we must agree with Fuchs that, so long as specific reactions to the sympathetic process (biologic, tinctorial, or microchemic) are lacking, or the exciting agent remains undiscovered, no positive conclusions can be drawn in the incipient stage with imperfect development of sympathetic infiltration.

A. C. S.

Associated Visual Palsy of the Voluntary Side Movements of the Eye With Retention of the Reflex Movements Emanating From the Semicircular Canals.

ROEXNE, H. Copenhagen (*Klin. Monatsbl. f. Augenheilkunde*, Vol. XLIX, November, 1911). In the last year several cases of palsy of associated movements of the eye have been reported in which there has been a peculiar dissociation between the purely voluntary movements and those apparently due to habit, which must be viewed as due to reflex action. For instance, a patient will be unable to make an intended associated lateral movement of the eyeball, and yet can accomplish this easily if he is made to fix an object and then turn the head in an opposite direction, causing a turning of the eyeball relative to the orbit. Biekschorsky explains this properly by supposing an interruption between the cortex and muscle nucleus with retention of a reflex connection from the semicircular canals through the vestibular nerve to the muscle center. Movements of the head in a certain direction cause a flow of the fluid in the corresponding semicircular canals which cause irritation through the reflex fibers, enabling the patient to maintain the visual direction, irrespective of whether the patient moves his head or not. It is reasonable to support this view which gives the individual free movement of the head, which otherwise would be solely dependent upon

visual fixation. The presence of this reflex passageway is proved by Barany's well-known studies. Roenne reports a case occurring in a 39-year-old woman, who suffered from severe headaches. In November, 1909, she entered the hospital on account of her uncertain gait. Her condition gradually became worse with development of uncertain speech, diplopia, and inability to turn the eyes laterally. In July, 1911, a diagnosis of disseminated sclerosis was made. The patient could not turn the eyes sidewise, but if when fixing a candle centrally, the head was turned suddenly to one side, the eyes could without difficulty move to the extreme periphery.

F. K.

Ocular Disease in Myxedema.

HENNICKE, CARL R., Gera (*Klin. Monatsbl. f. Augenheilkunde*, Vol. XLIX, November, 1911), reports a case of myxedema occurring in a 53-year-old man, in whom there was a neuroretinitis and gradually loss of vision. The man had been taking thyreoidin for about eight years with relief from the myxedema, but with increase of the ocular symptoms. Cessation of administration of the thyreoidin showed a marked increase of vision from excentric counting of fingers, in the worse eye to 6/30. There was a marked increase, however, in the myxedema. At first the patient had unilateral temporal hemianopsia, with later similar affection of the fellow eye, giving him a bitemporal hemianopsia due probably to the enlargement of the hypophysis.

F. K.

Dermoid Cysts of the Upper Lid With Epidermis and Mucous Membrane Epithelium.

PURTSCHER, Vienna (*Gräfe's Archiv. fuer Ophthal.*, Vol. LXXX, Part 2), reports two such cases with full pathologic findings.

A. C. S.

A Contribution to the Anatomy of Cysts of the Cornea and Anterior Chamber.

CLAUSNIZER, TH., Tübingen (*Klin. Monatsbl. f. Augenheilkunde*, Vol. XLIX, October, 1911), gives the microscopic results in the case of a corneal cyst developing in an eye three years after a severe lacerated wound of the cornea made with a screwdriver. The eye had made a prompt recovery after excising a piece of prolapsed iris, giving nearly normal vision

for one year. Attempted removal of the cyst, which almost filled the anterior chamber, resulted in iridocyclitis followed by enucleation. Microscopically there were three distinct cysts located in the anterior section of the eyeball. They were closely united in places and were evidently implantation cysts due to the sinking in of the corneal epithelium which formed the covering of the cysts. F. K.

The Effect of Dyes' Venesection in Glaucoma.

GILBERT, W., Muenchen (*Gräfe's Archiv. fuer Ophthal.*, Vol. LXXX, Part 2), concludes from extended clinical observations that: 1. Periodic venesection regulated by blood and intraocular pressure is of value in the prodromal stage of the disease, not to the exclusion of miotics, however, and treatment of the general condition according to Eversbusch's rules. 2. In evolved glaucoma, venesection should be the first therapeutic measure, preceding a prospective operation for glaucoma simplex by six to twenty-four hours, for inflammatory glaucoma by twenty-four to forty-eight hours.

A. C. S.

On a New Method of Treating Acute Gonorrheal Conjunctivitis.

GOLDZIEHER, W., Budapest (*Wiener klin. Woch.*, November 23, 1911). The treatment is based on the fact that 44 to 45 degrees Centigrade suffice to destroy the gonococcus. The writer has devised an electrical apparatus by means of which steam can be applied to the lids without annoying the patient with drops of condensation. When the nozzle is 3-4 cm. from the everted lids, 52-45 degrees respectively act upon the conjunctiva. The first application causes considerable pain, which unfortunately cannot be relieved by cocain. Subsequent treatments, however, are not attended with much pain.

Fifteen eyes with gonorrheal conjunctivitis (most of the patients being adults) were subjected to this treatment. In ten the cornea was clear on admission. In these a speedy cure was effected without involvement of the cornea occurring. In the other more unfavorable cases the inflammatory process was checked. In two eyes which showed almost complete suppuration of the cornea, some vision was preserved with the aid of conjunctival plastic.

He considers this method unquestionably superior to the silver nitrate treatment, since it reaches more deeply lying structures, the tarsus and the upper cul-de-sac. A. C. S.

Concerning Vitreous Substitution—Part 1. (Experimental Investigations.)

LOEWENSTEIN, Prague, and SAMUELS, New York (*Graefe's Archiv. fuer Ophthal.*, Vol. LXXX, Part 3), submit the following conclusions: 1. That the vitreous of the rabbit may be replaced by salt solutions. 2. The most suitable concentration is an .85 per cent solution. 3. The substituted quantity (in small animals) may be as much as .8 cc. without endangering the transparency of the substituted vitreous. 4. The vitreous remaining is transformed by the injected fluid into floating, brilliant flecks. 5. With hyper- or hypotonic solutions (Hamburger) the resulting vitreous is less transparent. 6. After withdrawal of vitreous by suction without subsequent injection, the transparency is only reestablished if not more than .4 cc. (about a third of the total content) are removed. 7. Fluorescein tests show that no vitreous passes into the anterior chamber, even after evacuation of the aqueous humor. A. C. S.

Concerning Vitreous Substitution—Part 2.

ELSCHNIG, Prague (*Graefe's Archiv. fuer Ophthal.*, Vol. LXXX, Part 3), resorted to vitreous substitution in 16 patients. In brief the technic is as follows: The eyeball is rotated up and in, and a radial conjunctival incision is made 12 mm. from the limbus, exposing the sclera. A purse string suture is then introduced through conjunctiva and sclera, and an especially constructed trocar and canula (vide original) thrust through the sclera between the sutures: .5-.6 cc. vitreous are withdrawn and replaced by the same quantity of normal salt solution from another syringe. The canula is withdrawn, at the same time the suture drawn tight, approximating the wound edges. Atropin, bandage, eight days' rest in bed.

In four eyes with vitreous hemorrhages (two due to vessel degeneration, two following glaucoma operations) excellent results were obtained, in two eyes the vision improving from hand movements to .3 and .8 respectively.

The aspirated vitreous, contrary to suppositions deduced from the ophthalmoscopic examination, resembled a blood serum-like, flocculent fluid without blood coagula.

In six cases of dense vitreous opacities the result of iridocyclitis, some clearing of the vitreous occurred in two. In two cases of purulent hyalitis the operation had a beneficial effect. In one case of vitreous opacities with retinal detachment, secondary glaucoma was produced, probably because of the injection of too much salt solution (1 cc.). In two other cases, in which more than .5 cc. were injected, a rather marked iritis with hypopyon ensued.

Elschnig attributes the favorable results so far obtained to the substitution of a fluid more nearly like the normal vitreous for the pathologic, dense vitreous, rich in albumin. The injection of salt solution not only prevents a rapid exudation of albumin, but by reestablishing tension exerts a favorable influence upon the ocular circulation.

While further clinical observations are necessary to prove the value of the operation, it seems that it is principally indicated in hopeless cases of vitreous hemorrhages, in fresh injuries with much loss of vitreous, and in nonmycotic vitreous infiltrations following perforation or foreign body injuries.

A. C. S.

Fixation of the Suture at the Corneal Limbus in Advancement Operation.

DENIG, R., New York (*Graefe's Archiv. fuer Ophthal.*, Vol. LXXX, Part 1), claims that in order to secure satisfactory results the anchoring suture should perforate or nearly perforate the sclera. On account of the proximity of the uvea, however, this procedure is not entirely free from danger. Therefore, the writer recommends fixation of the suture at the limbus which he perforates. The conjunctiva is dissected away from the limbus, the eye fixed by an assistant and the needle passed obliquely through the limbus about 2 mm. above the horizontal diameter, the point of the needle just presenting in the anterior chamber, counter puncture being made about 2 mm. below the horizontal diameter. In twenty-five cases no unfavorable complications occurred. Contrary to expectations, no postoperative astigmatism was produced.

A. C. S.

Contribution to the Operative Treatment of Regular Astigmatism.

LEVINSOHN, Berlin (*Munch. med. W'och.*, December 5, 1911), reports a case of astigmatism treated by operation in a chauffeur whose prospective employer insisted on good vision without correcting lenses. O. D. V. = 5/15; O. S. V. = 5/25. O. D. V. c. + 2.50 cyl. ax. 70 = 5/5. O. S. V. c. + 5.00 cyl. ax. 100 = 5/10.

Levinsohn accordingly made a lancet incision 2 mm. distant from the limbus in the right eye; in the left eye he resorted to galvanocauterization. The latter procedure was followed by considerable reaction, but by no improvement in vision. The vision of the right eye improved to 2/3 with correction, + 75 sph. c. + 1.50 cyl. = 5/5. The patient was so well satisfied with the result that he declined further operative measures. The section should be made perpendicular to the strongest refracting meridian and 2 mm. distant from the limbus.

A. C. S.

The Treatment of Orbital Mucocele, Particularly the Endonasal Therapy of Mucocele of the Ethmoid Bone and Tear Sac.

AXENFELD, TH., Freiburg (*Klin. Monatsbl. f. Augenheilkunde*, Vol. XLIX, October, 1911). When inflammations of the frontal or ethmoidal cells encroach upon the orbit, forming periosteal abscess and endangering the globe, they must be attacked from the orbital side. Axenfeld believes that a superior cosmetic result is achieved by opening the ethmoidal cells from the nasal side after removal of the middle turbinate bone, which has caused softening or necrosis of the lacrimal bone. He reports an enormous lacrimal cyst in association with a large mucocele of the same side, due to ethmoidal disease, that healed after an endonasal operation which included opening of the lacrimal sac from the nasal side.

F. K.

The Use of Carbonic Acid Snow in the Treatment of Angioma of the Lid.

CAPAUNER, L., Mulhausen i. Els (*Klin. Monatsbl. f. Augenheilkunde*, Vol. XLIX, November, 1911), has used carbonic acid snow very successfully in two cases of large angiomas of the lids in little children. Applications were made at intervals of about ten days to allow all inflammatory symptoms

to pass away between treatments. The snow is forced by the author into a small glass tube 1 cm. broad by 1 cm. long and about 1 mm. thick, by means of a wooden plug. Pressure upon the plug forces out the snow as desired without danger of injury to the conjunctiva. The author finds a toleration established by the skin after a few applications, so that the time of treatment may be lengthened from thirty to sixty seconds. In acute trachoma the author's experience in one case leads him to believe that expression and massage with bichlorid solution are superior to applications of carbonic acid snow.

F. K.

ABSTRACTS FROM FRENCH OPHTHALMIC LITERATURE.

BY

M. W. FREDERICK, M. D.,

SAN FRANCISCO,

AND

JESSE S. WYLER, M. D.,

CINCINNATI.

Researches on Ocular Tonometry.

ROLLET AND CURTIL, Lyon (*Recherches de tonométrie oculaire, Rev. Gén. d'Ophthalmologie*, 1911, Vol. XXX, p. 481), advocates the use of the Schiötz tonometer in testing the ocular tension. They measured usually normal eyes after instillations of various drugs, and the measurements were made every five minutes until the tension was again normal. They found that the tension was raised by eucain B., alypin, cocain (slightly), euphthalmine, duboisin, and scopolamine; it is lowered by eserine and especially by adrenalin, which in inflamed eyes sometimes causes a real collapse of the eye. Pilocarpine does not lower the tension of the normal eye. Holocain, tropococain and acocain do not affect the tension. C. L.

Retinitis Albuminurica Gravidarum.

GUÉRIN (*Rétinite albuminurique gravidique, Thèse de Lyon*; abstr. in *Rev. Gén. d'Ophthalmologie*, 1911, Vol. XXX, p. 506) says that albuminuria during pregnancy is much less grave than afterwards. His statistics show three deaths and one amaurosis in twenty-two cases. The deaths were due to a true nephritis. Cases occurring after pregnancy usually die in one to two years. Since most of the cases of retinitis albuminurica gravidarum recover, it is not always necessary to produce abortion. C. L.

The Amaurosis of Tabetics.

JAWORSKI (L'Amaurose des tabétiques, *Thèse de Paris*; abst. in *Rev. Gén. d'Ophthalmologie*, 1911, Vol. XXX, p. 518) says that tabetic atrophy of the optic nerve is the most frequent cause. It begins as a monocular amblyopia affecting the peripheral vision first, though there is no contraction of the visual field characteristic of tabes. Its evolution is gradual and varies with the patient. Pathologically, there is a vasculo-connective tissue new-formation followed by sclerosis. The point of departure is the nerve itself, near to the sheath, in the region of the globe. The fibers have either disappeared or are only so much altered that they resemble regenerating fibers.

C. L.

Neuritis Optica and Meningeal Processes in Neoplasms.

SEGAUX (Névrites optiques et processus méningés chez les néoplasiques, *Thèse de Paris*; abst. in *Rev. Gén. d'Ophthalmologie*, 1911, Vol. XXX, p. 518) states that neuritis is a complication of malignant neoplasms, but as it is usually terminal, is rarely noted on account of the cachexia. Most authors regard it as a toxic neuritis, but it is probably a part of a general meningitis extending along the sheath of the optic nerve.

C. L.

Subacute and Late Complications After the Operation for Cataract.

LAGRANGE AND LACOSTE (Des complications subaigues et tardives après l'opérations de la cataracte, *Archives d'Ophthalmologie*, 1911, Vol. XXX, p. 769), as the result of an examination of 100 patients operated for cataract, came to the following conclusions:

(1) When the lacrimal passages are intact, and when the test dressing shows that no conjunctivitis exists, the number and nature of the microbic colonies before and after the operation have no influence on the final outcome.

(2) The conjunctival flap has many remarkable properties against primary infection, but has no effect on late ones.

(3) The role of fistulization of the cicatrix by incarceration of the iris or capsule in the lips of the wound is incontestable, but it is far from being the only cause, as Duverger claimed; it is not even the most frequent.

(4) Postoperative retention of cataract substance plays a very great role in the appearance of late manifestations.

(5) The general state has a still greater influence; it is the chief predisposing cause of iridocyclitis tarda.

In a lengthy article, with numerous case histories, they give the reasons for their position. C. L.

The Best Method of Extracting Floating Lenticular Nuclei.

TERSON, A. (Le procédé de choix pour l'extraction des noyaux cristallins flottants, *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 705), advises the following method: (1) Local anesthesia preceded by a miotic. (2) Fixation of the nucleus by a very long, delicate and sharp needle, bringing the nucleus into the nasal part of the anterior chamber, and then confiding the needle to an assistant. (3) Oblique linear incision of the inferoexternal limbus. (4) Confide the fixation forceps to an assistant and take hold of the needle with the left hand. Introduce a fairly large curette or loop, and extract the nucleus by a combined movement of curette and needle. C. L.

The Cyclopic Image in the Plane Mirror.

OYIO, G. (L'image cyclopie dans le miroir plan, *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 710), means by this term the phenomenon of seeing only one eye when looking into a plane mirror, obtained by fixing a point instead of the image itself. It is best seen at 1 meter's distance, though it may be seen at greater or less distances. Accompanying the cyclopic image is a distortion of the face, but it can be still recognized. The phenomenon is due to a combination of diplopia and abstraction; diplopia, because one is looking at objects at different distances, and abstraction, because the image seen by each eye can be made to appear and disappear, finally replaced by that of the median eye. C. L.

A Radical Operation for Trachomatous Entropion and Trichiasis.

ELEUTHERIADES (La tarsopleptinosis combinée-opération radicale de l'entropion trachomateux et du trichiasis, *Archives d'Ophthalmologie*, Vol. XXXI, p. 716) describes the following operation:

(1) A horizontal incision is made 3 mm. above the free margin of the lid, and a second one 3 to 4 mm. above the first with the concavity downward, their extremities meeting. The enclosed flap is dissected off.

(2) The lower flap is stretched by a double hook, in order to free the margin of the tarsus. The projecting parts of the latter are then gradually removed by means of a cataract knife, until it becomes very thin.

(3) Two rows of sutures are inserted, one holding the inferior flap to the tarsus, and the other uniting the lips of the musculocutaneous incision.

(4) The sutures are tied so that the knots lie on the free margin, and are drawn only tight enough to accomplish the eversion desired.

The photographs show the results obtained are excellent.
C. L.

A Case of Retinitis Proliferans.

TEULIÈRES (Sur un cas de rétinite proliférante. *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 723) reports a case of retinitis proliferans which followed a hemorrhage during a period of dysmenorrhea, and states that in his opinion this lesion would be found more frequently if all cases of intra-ocular hemorrhages were followed to their final termination.
C. L.

Double Panophthalmitis in the Course of a Pneumococcus Septicopyemia.

BEAUVIEUX AND LACOSTE (Double panophtalmie au cours d'une septico-pyémie pneumococcique. *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 727), reports this rare case. The left eye was affected on the third day of the attack, and the right on the fourth day. The patient died on the eighth day of her illness.
C. L.

Retroocular Cyst and Pseudomicrophthalmos.

TERRIEN (Kyste retro-oculaire et pseudomicrophthalmie. *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 787), reports a case of congenital cyst of the optic nerve accompanied by an apparent microphthalmos in a child of 8 years. The microphthalmos was due to a retraction of the anterior segment of the eyeball. The rest of the dimensions were normal.
C. L.

Argyriasis of the Ocular Conjunctiva and of the Skin.

GABRIÉLIDÈS (Argyriasis de la conjunctive oculaire et de la peau. *Archives d'Ophthalmologie*, 1911, Vol. XXXI, p. 796) reports the case of a man who had been a worker in a factory

making films and plates covered with albuminate of silver. In about five years his whole body was becoming bluish. In addition, all mucous surfaces were discolored. Both the dermal and conjunctival surfaces of the lids were discolored in varying amounts.

A second case affected the lids, and was due to the use of silver nitrate and protargol.

The author made experiments with 5 per cent cyanid of potassium, tincture of iodine with 5 per cent potassium iodid, pure nitric acid, euehlorin, sodium phosphate, hyposulphite of sodium, permanganate of potassium, to determine the relative blanching of silver stains and the normal pigments of the body. A microscopic examination showed the grains of silver between the muscle cells, especially the *erectores pilorum*. They were found also in the sudoriparous glands, exactly outlining the acini. Elsewhere they were also found but not systematically arranged.

The conjunctival epithelium was greatly thickened and unstained, but the stain was found abundant in the subepithelial layer, in the vessel walls and adenoid tissue. The fibrous layer is also involved, but less extensively. C. L.

Phlegmon and Acute Suppurative Osteoperiostitis of the Orbit.

SAMEH, BEY, Cairo (Le phlegmon et l'ostéo-periostite aigue suppurative de l'orbite, *La Clinique Ophthalmologique*, Vol. XVII, p. 633, December, 1911), gives the history of two cases of phlegmon, and of two other cases of acute suppurative osteoperiostitis of the orbit. The first case of phlegmon could not be attributed to any trouble in the bony walls of the orbit nor in the adjoining sinuses. The patient, a boy of 14, had been attacked a week previous to his first visit with chills, fever, insomnia, headache, vomiting, nosebleed, swelling of the lids. The eye is much inflamed and protruded. The sight is much diminished. The lids do not cover the globe, the cornea is cloudy. The ophthalmoscope discloses a condition of the fundus like the first stages of choked disc. An incision was made near the lower orbital margin, and a slender cataract knife introduced, which was made to follow the lower orbital plate. As this did not produce any pus, a grooved sound was next introduced, and after a few lateral movements about fifty grams of thick pus were voided. A drainage tube was then

inserted, and removed on the sixth day, when all discharge had ceased. On the eighth day perfect healing had taken place, and the eye had returned to its normal position. Gradually the sight improved until it was $= 1/2$, the other eye having a vision of $2/3$. The second case of phlegmon was similar to the first, except that the sight remained permanently impaired, the disc being very pale after a year's time.

In a 25-year-old negress of lymphatic constitution, who had fever for five days, the upper outer part of the orbital margin was swollen and painful to the touch. Upper lid swollen, eye somewhat prominent, and crowded down and in. Eye movements restricted, diplopia. Cloud in vitreous, vision $= 1/8$. On the ninth day fluctuation was evident, and forty grams of pus were voided through an incision with a bistoury. A iodoform drain gauze was inserted after washing the cavity with a solution of biniodid of mercury. Healing was complete in twelve days. The patient was placed on sirop de Gibert, and in three weeks the sight had risen to $1/2$.

In the second case of osteoperiostitis the patient was a boy of 10, who had been sick four days, and who presented a swelling in the upper interior region of the right orbit. The other symptoms were similar to those of the first case, and the vision was reduced to counting fingers at two meters. Through an incision forty-five grams of pus were voided, and in a few days everything was in order.

(Although the author states that nothing was wrong with the sinuses in the first case, it seems to me that is merely a general remark. He does not seem to have given the nose the attention that it deserves in this class of cases.—EDITOR.)

M. W. F.

Newer Procedures in Staphylotomy.

SAMEH, BEY, Cairo (Nouveaux procédés de staphylotomie, *La Clinique Ophthalmologique*, Vol. XVII, December, 1911, p. 637). has a record of 1,080 cases of staphylotomy, so that his conclusions would seem to be worthy of consideration. Owing to the nature of the eye diseases prevalent in Egypt, staphyloma is of frequent occurrence, and Sameh says that most of the methods described in the textbooks for performing staphylotomy are very unsatisfactory. I give his article, therefore, somewhat in extenso.

1. Partial staphyloma. When the staphyloma is restricted

to a corneal ectasia, which is generally opaque, he first practices arrachement of the iris with the strong forceps specially devised by him for this purpose. This is generally sufficient to arrest the development of the staphyloma and to make the cornea reassume its normal shape. In some cases, especially in peripheral staphyloma, where this arrachement is not sufficient, he adds transfixion of the staphyloma in its longest diameter with a slender cataract knife.

2. In partial staphyloma with iridic adherence or small projecting leucoma, he opens the anterior chamber with a lance, and cuts the synechize with his synechitome, which is really a short de Wecker spatula, sharp on both sides. The arrachement of the iris, which this procedure has made easy, is then performed.

3. In staphylomata of medium size with strongly adherent iris, he begins with a transverse incision of the staphyloma to within three millimeters of its edges; the synechitome is then introduced and the iris detached. The separate parts of the iris are then drawn out; this is easily done if the iris is seized at its ciliary attachment and steadily withdrawn. The operation is concluded by extracting the lens, even though it be transparent. The capsule is opened with the point of the knife, and gentle pressure on the cornea with a curette gives birth to the lens. No corneal suture is used.

4. Pediculated staphyloma is cut off at its base with a convex bistoury. With a suitable bandage, healing with a flat scar is obtained.

5. Total corneal staphyloma, conical or spherical. He begins by excising an elliptical piece from the cornea. Arrachement of the iris and extraction of the lens, which is frequently cataractous, is practiced, and the operation is concluded by placing a corneal suture, or at the most two; the sutures are lightly placed and removed on the third or fourth day. Escape of liquid vitreous is of no consequence. In ten to fifteen days the eye has assumed a fairly spherical shape, and no prosthesis is necessary.

6. In the enormous distensions of cornea and sclera exenteration is practiced, and care taken to secure a good stump for a prosthesis. The article concludes with an analysis of the cases.

M. W. F.

Is Vertical Writing Better Than Slanting?

PECHIN AND DUCROQUET (Écriture penchée, écriture droite, *Archives d'Ophthalmologie*, Vol. XXXII, January, 1912) in a very long article have proven to their own satisfaction that slanting writing is much preferable to the vertical variety. The article is replete with polemics which are not worth excerpting.

M. W. F.

The Use of Hot Air in Ophthalmology.

AUBARET, Bordeaux (De l'emploi de la douche d'air chaud en ophtalmologie, *Archives d'Ophthalmologie*, Vol. XXXII, January, 1912), describes a hot air blast which he has used for the past few months in a number of ocular affections. The patient is seated at some distance and the blast of hot air directed either against the closed pupils or against the partially exposed globe. If the temperature is not high, the sensation is at first that of a pleasing warmth, followed by a sensation of burning as the tissues become heated. The orbito-palpebral tissues become congested, a mild exudation takes place, and at the end of five or ten minutes the sitting is finished. He groups the conditions treated as follows:

1. Blepharoconjunctivitis. Acute conjunctivitis is favorably influenced, and the sensation of a foreign body, the pain, and tearing rapidly decrease. In cases of lymphatic conjunctivitis the photophobia and profuse tearing rapidly disappear, but they do that with other methods of treatment also. Nevertheless, in certain cases of intractable chronic blepharitis and conjunctivitis, persistent tearing and ectropion, the inflammation of the conjunctiva and lids seem to be very favorably influenced by the hot air.

2. Keratitis. Here the author has had much success with the hot air. In cases of serpiginous ulcer, however, the result was just as poor as with the other modes of treatment. In cases of chronic ulcer with secondary infection and hypopyon, rapid absorption of the pus and healing of the ulcer was noted. Phlyctenular keratitis and ribbon keratitis, so rebellious in children, were greatly shortened in the duration and cured. The transparent ulcers in adults were not as much benefited, but the action of the hot air was favorable. In some cases the action of the hot air seemed to be of temporary benefit only.

but cures were effected by persisting in the use of hot air in spite of the recurrence of the keratitis.

3. Iridokeratitis. In persons suffering with iridokeratitis, that is in those whose keratitis is complicated with iridic or orbital pains, the relief is immediate, the pains disappearing promptly. Dilatation of the pupil, which was unattainable before, takes place after a few sittings, and the iris trouble rapidly diminishes. The same result was had in cases of rebellious episcleritis, even where it was complicated with iritis or iridochoroiditis. The results in these cases were really remarkable.

4 Iritis, iridocyclitis, and iridochoroiditis. This was the most grateful class of cases. In acute iritis, whether of a rheumatic or other nature, the pains were considerably diminished and the attacks were much less frequent. In a case of serous choroiditis with diffuse vitreous trouble, the result was less apparent. In traumatic iridocyclitis, and in the variety following cataract extraction, the inflammatory symptoms rapidly diminished. Pain in the eye and radiating into the head readily yield to the hot air. While hot vapors have been applied to the eye, the author thinks this is the first attempt at treating the eye with dry heat, if one excepts the use of the thermocautery, and with this latter the author thinks that part of the benefit is due to the radiation of dry heat. M. W. F.

Ocular Accidents Attributed to Arsenobenzol.

COUTELLA, CH. (Des accidents oculaires attribués à l'arsénobenzol, *Archives d'Ophthalmologie*, Vol. XXXII, January, 1912), divides the accidents observed after the use of "606" into three categories:

- 1 Lesions of the uveal tract.
2. Lesions of the optic nerve.
3. Lesions of the motor nerves of the eyeball and lids.

Under 1 Coutella points out the absurdity of attributing to salvarsan the papular iritis and epileptiform seizures observed in a patient with syphilis of four months' standing, one month after an injection of salvarsan. Just as absurd in the contention of Finger, that the peripheral choroiditis and central vitreous opacity seen in a man of 28 three months after the injection of salvarsan and eight months after the initial lesion, with negative Wassermann, were caused by the drug.

In both cases we have to deal with somewhat early manifestations of secondary syphilitic lesions, and the drug cannot be blamed for anything in this matter.

Under 2 the cases of Jansen and Spiethoff, both tabetics, one of whom had scintillations and temporary obscuration of vision four hours after the intravenous injection of 0.45, and the other loss of vision for several minutes fifty hours after the injection. Coutella simply remarks that in tabetics the drug should be used with extreme caution. In regard to the cases of optic neuritis, and neuroretinitis, with or without subsequent optic atrophy, and even with edema of the disc, Coutella denies that they are attributable to the use of salvarsan. He says that the only reason the reporters have for blaming the drug is the early appearance of the nerve lesion, at a time when it is never observed in patients treated with mercury or even not treated at all. Against these authors he cites the writings of Hutchinson on the ocular troubles appearing during the first six months of syphilis, and the observations of several others, such as Dufour and Groenouw, who have shown that such lesions occur frequently in from one to five months after infection. On this point he has the support of numerous observers who, having seen optic neuritis several months after one or more injections of salvarsan, have not hesitated to accept the syphilitic etiology for the nerve lesion. Another reason for exonerating salvarsan is the fact that even in countries where the use of arsenic is a local vice, as, for example, in Styria, the oculists have little to say about eye manifestations. During the wholesale poisoning with arsenic beer in London and Liverpool in 1900, but one case of eye trouble, and that a purely subjective one, was mentioned, and no fundus changes were observed.

In 100,000 cases Uthoff found but one case which could be attributed to arsenic, and even that is not indisputable, according to Dufour. This was a case of Liebrecht, in which amblyopia and central scotoma were caused by the prolonged use of arsenic pills. The cacodylates, which are so extensively used, have never been known to cause an eye injury. Sulzer has reported six cases of toxic neuritis caused by the ingestion of arsenate of sodium and potassium (central scotoma, without narrowing of the fields, and blurring of the discs without discoloration). Sulzer thinks one should avoid the combina-

tions of arsenic with the "benzol" radical, the prototype of which is atoxyl, without being able to say whether the arsenic or the anilin is the noxious part.

Coutella further denies the assertion that the use of "606" hastens the onset of neuritis, and cites a number of authors to show that early onset of nerve lesions occurs in from 19 to 35 per cent of the cases.

The third category is not as easy to dispose of as the other two headings, as it is difficult to distinguish clinically between infectious and toxic paralyses of the ocular muscles. Nevertheless, Coutella, in view of the extreme rarity of arsenic paralyses, is inclined to attribute a syphilitic origin to them, as syphilis has been shown by the various authors to be responsible for 58 to 75 per cent of ocular paralyses. One should also bear in mind the possible presence of syphilitic osteoperiostitis, etc., and of meningeal changes which might affect the nerves in their course. Lumbar puncture has shown a marked lymphocytosis, even when the cord was normal, and this condition has been known to produce ocular paralyses long before arsenobenzol was used. There are also many well authenticated cases of early appearance of the paralyses, one even two weeks after the initial lesion, where one could not speak of a precocious tertiary stage in the course of a malignant syphilis. Certain authors felt themselves justified in speaking in these cases of the untoward effect of mercury. Others, of the same frame of mind, blamed Roux's serum for the postdiphtheritic paralyses; is it not quite natural that the same bent of mind should cause others to accuse salvarsan for all extraordinary happenings after its use? The number of oculomotor recidives after the use of "606" varies greatly according to the various authors, 0.9 per cent being the average. Finger, the determined opponent of salvarsan, found just ten times that amount, whereas Arning's figure was 0.2 per cent. Coutella thinks, with Saenger of Hamburg, that the nervous lesions in syphilis have been rediscovered, because our attention has been attracted to them in a marked manner by our new therapeutics.

Coutella cannot, however, explain in such a satisfactory manner the three cases at the close of his article:

In a case of Sicard, Bizzard and Gutman, the lesion dated from February, 1911; secondaries appeared in April, 1911. April 15th, and May 6th, intravenous injection of 0.40 and

0.50 arsenobenzol. The day following the second injection there was buzzing in the ears, headache and vertigo. Five or six days later paralysis of the right acoustic, the right spinal, the left facial, the right oculomotor, bilateral rigid pupil, double optic neuritis with retinal exudates, and diminution of the visual acuity. Wassermann, positive, lymphocytosis very abundant. With the exception of the immobile pupils an almost complete cure was effected by the injection of small doses of arsenobenzol and benzoate of iodine.

CASE 2. Man of 42, florid secondaries. Injection of salvarsan; the same evening vertigo, rigors. Ten days later another injection. The following day facial paralysis, oculomotor and externus paralysis, deafness of right ear. No fundus lesion. Abatement of symptoms under small doses of salvarsan.

CASE 3. Woman aged 34. Syphilis of five months' standing. At intervals of ten days two injections of salvarsan of 0.40 and 0.50. On the day following the second injection paresis of the left oculomotor and left facial, headache, vertigo, and ringing in the ears.

The explanation of these cases demands a great deal of ingenuity on the part of one who denies that arsenic was the cause; the most plausible explanation seems to Contella to be the fact that strong doses of "606" liberate a number of endotoxines. The other theories, that the spirochetæ are brutally driven back to the nerve centers from the cutaneo-mucous surfaces; or that the presumably slight toxic action of salvarsan on the cranial nerves makes them a locus minoris resistentiæ for the syphilitic virus, are also given. Most authors deny that salvarsan is neurotropic, and regard the nerve recidives as ordinary syphilitic manifestations.

In closing, Contella says that much has yet to be learned regarding the dose and technic of administering salvarsan, but he thinks it will be found an excellent remedy against serious syphilitic involvement of the nervous system, of the eye, and of the optic nerve.

M. W. F.

Acne Rosacea of the Cornea and Its Treatment.

DARIER, A. (*La Clinique Ophtal.*, Vol. IV, No. 1). This condition produces pustules of the cornea which might be confused with phlyctenular keratitis but for the age of the patient,

the appearance on the face, the recurrences for many years, and the deep scarring which results. Arlt, Schirmer, Stephenson, Capauner and Erdmann are cited, with their ideas and statistics. The palpebral conjunctiva shows nothing characteristic. The bulbar mucous membrane shows more or less congestion with episcleral nodes, which disappear completely after several weeks. These are gray in color and not transparent. Millet seed sized nodules appear in the subepithelial layer of the cornea, penetrating into the parenchyma, and the rest of the epithelium becomes chagreenated. They are absorbed but always leave opacities accompanied by vascularization, and in certain cases have a reflex resembling cholesterol. Iritis is rare. Subjective symptoms are variable with neuralgic pains so intense that radium furnishes the only relief in some cases. Author cites and describes three of his cases, with illustrations.

He has not tried holocain instillations, but had best results with dionin, followed in an hour by gentle massage with yellow oxid or scarlet red salve.

Constitutional remedies are needed, as milk diet and alkaline waters. For the face lesions a ten minute massage with finely powdered turbith gr. iv in benzoated lard gr. xxx, left on over night, and vigorously performed. Radium applications for the pain, and iridectomy for optical reasons are necessary at times.

J. S. W.

Inflammatory Conditions Following Cataract Operations.

Jocqs, R. (*La Clinique Ophtal.*, January, 1912, Part 2). Conclusion: Strict asepsis is more important in ocular surgery than in any branch, because slight infections destroy the entire result. As the instruments alone touch the eye, there is no excuse for this infection. Jocqs gives histories of various extractions illustrating degrees and varieties of "inflammatory states."

A great class of irritation arises from a previous conjunctivitis. These manifest themselves on the third to eight day. This is avoided by making a conjunctival flap, which is the best preventive in such cases.

A second class is the sluggish irides without synechia, but gradually closing the pupil, probably due to the swelling masses of cortical lens debris reacting upon the already bruised tissues. Morax and the author favor this explanation in opposition to Lagrange.

The general condition as a factor has probably been much exaggerated, but if albuminuria, diabetes and rheumatism can produce iritis in unmutilated cases, why shouldn't this be more prone in the tissues weakened by operation?

There is a condition of weakened resistance of the tissue in the anterior part of the eyeball which produces slow resolution which the writer terms "temperament." This is not a neurotrophic disturbance, as was formerly supposed, but merely due to poor nourishment.

J. S. W.

Traumatism as a Factor in Producing Interstitial Keratitis.

FRANCE, Alexandria (*La Clinique Ophtal.*, January, 1912). Patient 37 years, with inability to see for past five days. Was struck over right eye with stone, following which he could not see. Examination revealed a granulating skin wound in lid. No conjunctival granulations, but slight hyperemia. In center of cornea a mass of fine gray points extending down to Descemet's membrane and forming a ring 3 mm. in diameter. No vascularization. Iris seen with difficulty, is dilated and presents a V shaped tear on the lower exterior part. Eye soft, no pain upon pressure. Fundus not visible. Probable hemorrhage into vitreous and retinal detachment. Pupil does not react to light. R. E. light preception only. L. E. normal. Patient physically well, fine teeth. Denies any disease, especially syphilis, of which there is no trace. No trace of hereditary taint. Sight good before accident. Case followed for three weeks, and then patient disappeared. It appears that this is one of those true traumatic interstitial keratitis cases, no other cause discernible.

J. S. W.

Optic Atrophy and Orbital Sarcoma.

CHARLET, H. (Atrophie optique et sarcome orbitaire, *Revue Générale d'Ophtal.*, January, 1912). Patient of 19 years with failing sight. All symptoms of Bright's disease. Right eye shows temporal pallor of disc with difference in elevation of 2 D. between right and left side of papilla. O. S., normal. Diagnosis was primary optic atrophy, possibly of nephritic origin.

Six months later a very appreciable exophthalmus of O. D., pupil dilated. No reaction except consensually. No thrill. The cause attributed to an orbital sarcoma (illustration).

Condition cachectic. Rhinoscopy anterior, shows tumor mass in middle meatus. Transillumination negative. Surgical intervention refused. In six more months growth had invaded the nasal fossa, the pharynx and all the neighboring tissues. Eye is almost dislocated toward the left and is immobile. The tumor was removed piecemeal at the time, patient dying from shock a few hours later.

Microscopically the mass was found to be a small round cell sarcoma. The interesting features are: firstly, the latent period of about nine months during which the tumor produced only the optic atrophy, and, secondly, the subsequent rapidity of growth with accompanying symptoms.

In the presence of an atrophy indefinite in origin, it is always well to suspect an orbital tumor and have a thorough nasal examination made; and the only possibility of success in these cases lies in an immediate and thorough operation.

J. S. W.

Treatment of Tobacco Amblyopia With Lecithin.

DANIS, M. (Traitement de l'amblyopie nicotinique par la lécithine, *Le Progrès Medical*, January, 1912). Report of five cases of this condition treated by hypodermic injection into the muscles of the back of an oily solution of 5 per cent lecithin. Two cc. are used. During observation the use of tobacco and alcohol prohibited. Results are variable. In first case, a betterment about eight days after the start. Improvement, however, continued after cessation of the treatment. The second and third received little benefit. The fourth, which was the worst case, gave the best results, but a decided regression upon discontinuing the lecithin. The fifth patient improved equally well by merely stopping the toxic substances. Danis considers it too early to draw a definite conclusion, because results are so variable.

J. S. W.

ABSTRACTS FROM SPANISH OPHTHALMIC LITERATURE.

BY

WILLIAM H. CRISP, M. D.,

DENVER.

Epithelial Dystrophy of the Cornea.

URIBE Y TRONCOSO, M., Mexico (*Anales de Oftalmologia*, October, 1911), has observed a case resembling those described by Fuchs under the name of epithelial dystrophy of the cornea. The patient, a woman of 30 years, had noticed poor vision of the left eye for a year. The sight was, she stated, completely obscured at intervals, and at such times a thick, gelatinous secretion gathered between the lids. Her history included a pustular skin eruption, amenorrhea since puberty, and convulsions. She was myopic. The affected eye showed no vascularization of the conjunctiva. The cornea was cloudy, of a dull, whitish gray color. The opacity occupied the lower two-thirds of the cornea. By oblique illumination it was seen to be made up of numerous white points. The cornea was without sensibility. The iris reacted well to light. Fluorescein produced no discoloration. The inferior cul-de-sac contained a little white thick mucous secretion. With the Schiötz tonometer the tension was found to be 14 mm. Hg. The only fundus lesion found after dilating the pupil was a posterior staphyloma. After unsatisfactory treatment with dionin and collargol, the patient failed to return.

Trachoma in Cuba. Treatment of Trachoma.

FERNANDEZ, F. M., Havana (*Anales de Oftalmologia*, November, 1911). During the first American intervention in Cuba, from 1898 to 1902, trachoma became epidemic in those cities which were occupied by white troops, but where there were only negro soldiers the disease did not make much advance. Dr. D. Rafael de la Torre, of Veracruz, is referred

to as the author of the following method of treatment of trachoma, which Fernandez applied to a series of 200 cases: The inverted lid is swabbed with a six per cent solution of cocain or alypin. After waiting a while for the anesthetic effect, another swab of cotton, first moistened in distilled water, is dipped into pulverized salicylate of soda, and then rubbed rather energetically along the inverted lid and back of the tarsus. There is a period of reaction, after which with each treatment the conjunctiva gets smoother; in the majority of the cases finally acquiring its normal aspect. The writer has now applied the method to a total of 600 cases, with only fifteen failures. Most cases have had from four to six applications at intervals of three or four days.

Traumatic Perforation of the Macula.

URIBE Y TRONCOSO, M., Mexico (*Anales de Oftalmologia*, November, 1911). A man of 31 years received on the left eye a blow from a cork, which struck precisely in the center of the cornea. The eye at once lost all vision. After several days peripheral vision returned, but there was a central scotoma whose shape was compared by the patient with that of a leaf of a grapevine. At examination a month after the accident there was a small iridodialysis up and in. Behind this was a limited opacity of the lens. The temporal half of the disc was atrophic. Up and out from the disc was a horizontal tear in the choroid. The space between the disc and the macula was covered with black points of pigment. At the fovea was a round, dark red blotch, with edges sharply limited and slightly protruding; its center was depressed and crossed by white streaks. This macular excavation had a diameter equal to one-sixth that of the disc. After an interval of four years the perforation presented the same appearance as when first seen.

Case of Blindness Due to Atoxyl.

GARCIA DEL MAZO, Madrid (*Archivos de Oftalmologia*, November, 1911). The patient, seen in September, 1909, had received by injection during the months of June and July, 21 grams of atoxyl. Since the middle of August he had noticed rapid diminution of visual acuity, and difficulty in seeing objects in the inferior nasal part of the field. There was also slight edema of the lids. There was marked diminution of

the visual field for all the colors, especially to the nasal side. Vision was $1/6$ in each eye. The discs were pale, without capillary vessels; and the retinal vessels were much narrowed. During October and November the patient was troubled by extreme retinal hyperesthesia. By the end of December vision was reduced to light perception. No benefit was obtained from treatment.

Preliminary Suture in Cataract Operation.

RIEAS VALLERO, Seville (*Archivos de Oftalmologia*, December, 1911). A modification of Kalt's suture is proposed by the writer. Both sutures are placed in the conjunctiva instead of in the cornea. One is put in what is to constitute the conjunctival flap, and in a direction parallel with the corneal limbus, and the other in the conjunctiva beyond the flap. The method is easier than that of corneal suture, and is less likely to lead to risky infections. Its only inconvenience is that it calls for more care in cutting the conjunctival flap, in order not to divide the thread. The cutting of the conjunctival flap may be facilitated by a previous subconjunctival injection close to the superior aspect of the limbus. When iridectomy is necessary, the suture may be used to draw the flap forward out of the way of the iris scissors.

Transitory Traumatic Opacity of Lens.

GINOT Y RIEAS (*Archivos de Oftalmologia*, December, 1911). A metal worker had a piece of metal about 1 mm. in length removed from his cornea, in which it was deeply imbedded. A further examination of the eye showed a moderate opacity of the lens, which was also subluxated down and out. Under atropin, vision returned to normal in forty-six days, and at the end of this time the only visible result of the injury was a slight corneal opacity.

ABSTRACTS FROM JAPANESE OPHTHALMIC LITERATURE.

BY

K. SHIMIZU, M. D.,

TOKIO.

W. NORTON WHITNEY, M. D.,

TOKIO.

Statistics of the Blind in Japan.

The number of blind men and women in Japan is 70,506, and they are living in moderate comfort, being employed as follows:

1. Masseurs and acupuncturers	4587
2. Moxa practitioners (cauterizing by burning the leaves of the artemisia moxa on the skin..	618
3. Musicians	4706
4. Story Tellers	246
5. Teachers	386
6. Other occupations	9159
7. No occupation	3253

S.

Ulcus Rodens.

HIDAKA, K., reports a case which he treated unsuccessfully by the usual methods, but which was greatly improved by bathing the eye with aqua formalinata 0.3 to 1000 to 0.5 to 1000. It was also used in the form of hot applications. There was no recurrence of the lesion. S.

Deafness and Paralysis of the Facial Nerve Following Use of 606.

NAKANO, H., reports a case of deafness and inability to close the right eye following the use of salvarsan. This disappeared after a few days. S.

An Unusually High Degree of Hysteria in a Man.

PUTIYA, I., reports the case of a man of 32 years who after a wound had an attack of hysteria, followed by a great loss of central vision. S.

Retrobulbar Neuritis Following Beri-Beri.

ANDO, K., reports a case of beri-beri in a man of 29 years, in the course of which there developed loss of vision, scotoma and slight hyperemia of the disc. The author regarded it as a case of chronic retrobulbar neuritis. Under treatment with mungo (bean), bakuhan (a food prepared by boiling a mixture of rice and barley) and Epsom salts, both the disease and the ocular affection were cured. S.

Teaching of Trachoma Prevention by the Department of State.

With the approval of the Imperial Diet, the Department of State opened a school for the instruction of school physicians and others in the prevention of trachoma. The first session was attended by over sixty physicians, etc., from every part of Japan. The school will be in session three times a year. S.

SOCIETY PROCEEDINGS.

BY

T. B. HOLLOWAY, M. D.,

PHILADELPHIA.

SECTION ON OPHTHALMOLOGY COLLEGE OF PHYSICIANS OF PHILADELPHIA.

Meeting October 19, 1911. Dr. William M. Sweet, Chairman, presiding.

Late Results of Contusion of the Globe.

Dr. T. B. Holloway cited the history of a colored boy who had been struck on the left eye by a stone one week before he came under observation. The point of contact was over the lower lid. The vision of O. D. was L. P. and of O. S. 6/6. The cornea was hazy, the pupil horizontally oval, and while not dilated it failed to react to light. Only a faint fundus reflex could be noted, and no view of the fundus was possible owing to the cloudy vitreous. There was no tenderness or thickening about the margins of the orbit. Four days later there was still some edema of the cornea, but no vitreous opacities could be seen. The entire temporal half of the fundus was covered by the most extensive bank of edema that the reporter had ever seen. The retinal veins were dilated and a number of flame-shaped hemorrhages could be seen. After ten days there was but very slight improvement, but from this time on there was a slow and gradual absorption of the retinal edema and an increasing pallor of the disk. Five weeks after the accident the edema was still quite perceptible about the macula, although the macula had practically cleared and no hemorrhages could be noted, but a series of tags of exu-

date could be noted at the top of the disk which showed marked pallor. The eye was slightly divergent. One month ago the vision of O. D. was 6/45 and of O. S. 6/6. The disk was markedly atrophic and the arteries thread-like. At the upper margin of the disk a few chalky white spots could be noted. A candle field taken some time after the accident showed light perception about the periphery.

Dr. S. D. Risley stated that cases of this type were very interesting, and referred to a series of cases he had reported some years ago.

Dr. Zentmayer said that the thought occurred to him that as a result of the marked and persistent edema of the retina, upon which Dr. Holloway had laid particular stress, there may have resulted a degeneration of the ganglion cells of the retina to which the optic atrophy was secondary.

Dr. L. F. Appleman stated that he had seen a case in which the patient had been struck over the left eye with a piece of wood, and that following this, complete atrophy of the nerve was observed without evidences of retinal edema.

Dr. Hansell said that the determination of the immediate cause of the optic atrophy was difficult. The probable explanations have already been offered, and of them I am inclined to accept that of fracture at the optic foramen. The cases described by Dr. Risley, to which he has alluded, seem to be analogous. In support of this supposition is the gradual and not sudden onset of blindness and the retention of only the extreme peripheral field. Had hemorrhage either in the optic nerve itself or in the sheath of the nerve occurred, we should expect immediate loss of a part of the entire field. It is true that a hemorrhage, if at all extensive, would also lead to atrophy.

In closing, Dr. Holloway stated that while he had referred to the possibility of a fracture about the optic foramen, there had been no evidences of a fracture of the orbit as far as could be detected by palpation. Certainly the edema was extensive enough to cause extensive changes in the ganglion cells of the retina.

Traumatic Aneurysm of Cranial Artery.

Dr. S. D. Risley presented two cases for study, each patient having a traumatic aneurysm of a cranial artery. The first had received a blow on September 4, 1911, from a man's

fist on the ramus of the right jaw, which rendered him momentarily unconscious. He remained in bed for a week, but had not been able to resume his vocation because of pain in the head, mental confusion, diplopia, and "a noise in his ears." He came to the Wills Hospital on October 2 for relief. He then had proptosis of the right eyeball, estimated at 10 mm., swelling of the lids, and slight chemosis of the conjunctiva, with full veins near the inner canthus. The rotation of the ball was impeded to the slightest movement in any direction except downward. The proptosis could not be reduced by pressure; there was no tactile thrill, but a well-marked pulsation synchronous with the arterial pulse and a characteristic blowing bruit, also synchronous with the systolic pulse, failing in diastole. This could be heard best over the eye, but was transmitted throughout the anterior part of the skull and over both ears. It was promptly arrested by pressure over the right internal carotid artery, and during the pressure the exophthalmos, as measured by the exophthalmometer, was reduced 4 mm. After ten days in bed the headache, swelling of the lids, and chemosis of the conjunctiva, disappeared, the proptosis diminished, and the blowing bruit changed to a high-pitched musical note, but was variable in quality; at times it could be heard with difficulty and not at all by the patient except by placing the ends of the fingers in the meatus of each ear.

Dr. Risley was inclined to the opinion that the lesion was in the ophthalmic artery after its emergence from the optic foramen, but pointed out the possibility of its being further back, where it interfered with the return circulation, possibly at the cavernous sinus; this view being suggested by the edema of the lids and pulsation of the ball. He felt that the former view was more tenable because of the impeded movement of the ball upward and the fact that the proptosis could not be reduced by pressure. There were no intraocular hemorrhages and but slight fullness of the retinal veins. Vision in the right eye was 6/12 and the lower temporal field was contracted, but this contraction disappeared after a week in bed. He thought it probable that ligation of the internal carotid would be necessary, but that in the meantime the pressure treatment and rest would be useful in aiding the establishment of the collateral circulation.

In case 2, three years before applying at the Wills Hospital, the patient, a man, aged thirty years, had been injured by having his head caught between a trolley car and an express wagon. He was taken, in an unconscious condition, to a hospital, where he remained for "seven weeks," most of the time unconscious of his surroundings, but tells of bleeding from his left ear and spitting blood; that for a long time food collected in his left cheek, and that his left eyelid could not be opened. When finally discharged he had great difficulty in getting about the street. He was dazed, had a noise in his head, either could not hear or could not comprehend what was said to him, and saw double. He then applied to another hospital, where he was treated by electricity applied to his ears for many weeks, without relief.

When applying at the Wills Hospital he had complete loss of power in the left external rectus, but no oculomotor impairment unless a doubtful sluggish reaction of the right pupil could be so interpreted. There was a doubtful, slight proptosis of the right eye, but the right side of face was more prominent than the left side. Central vision was normal in each eye, but the field of vision in the left was concentrically contracted to approximately 30° . There was a loud blowing bruit, synchronous with the systolic pulse, which could be distinctly heard over any portion of the skull, but loudest over the left side of the head anteriorly and over the right eyeball. The man himself says that when he closes the right eye the bruit almost ceases, but this is not verified by auscultation. The bruit becomes very faint under pressure upon the left internal carotid, and ceases entirely when the right is also closed by pressure. Through the courtesy of Dr. Manges and Dr. Sweet, painstaking X-ray plates were made of both cases, but no fracture in either case could be demonstrated or other important evidence obtained as to the location of the injury sustained. Dr. Risley thought, however, that the transient palsy of the upper lid on the left side and of the left cheek, together with the complete and permanent paralysis of the left externus, gave a fairly accurate idea of the location of the injury in the second case. That in view of the bleeding from the left ear there could be but little doubt that there had been a fracture at the base of the skull, and that the aneurysm was probably well back in the circle of Willis. He

thought the prognosis a nearly hopeless one so far as relief was concerned, since it could only be hoped for by ligation of both internal carotids.

Dr. Holloway stated that he realized that it was usually bad judgment to express an opinion in regard to cases of this character when seen the first time. In reference to the first patient shown by Dr. Risley, he felt that where there was a history of a blow on the jaw followed by pronounced exophthalmos, a subjective and objective bruit, which could be heard loudest over the affected eye, a pulsation that could be felt upon pressure of the globe into the orbit, and finally, the existence of a venous ectasia over which pulsation was detected—that these classic symptoms would warrant the suggestion that the patient had a pulsating exophthalmos, due to a rupture of the internal carotid in the cavernous sinus.

As to the second case resulting from a squeeze injury, despite the negative results of an X-ray plate made three years after the receipt of the injury, he believed that this patient had a fracture of the base of the skull involving the petrous portion of the temporal bone, and that the facial nerve was probably involved as a result of this injury. As to the other ocular nerve involvements, these might have occurred either as a direct result of the fracture, or may have resulted from lesions, probably minute hemorrhages, involving their nuclei. The case suggested one cited by Cushing, where the patient's head was caught between a beam and the side of a ship, and in which there followed ocular palsies of the left eye with marked pupillary changes, the exact character of which could not be recalled. This patient, after an improvement in his condition, some years later developed a pulsating exophthalmos of the right eye.¹ In the present case, with the presence of an exophthalmos and pulsation that can be felt upon pressure upon the globe and the existence of a subjective and objective bruit, Dr. Holloway thought that a pulsating exophthalmos due to the same cause as in the first case could not be excluded. While the bruit was heard loudest over the left side of the head, there was a distinct accentuation of the bruit over the right eye.

1. Since this discussion an abstract of Cushing's case history has been consulted, and it was noted that the pulsating exophthalmos developed three years after the original injury, and followed a slight blow on the back of the head.

Dr. Hansell said the first of Dr. Risley's cases had all the prominent symptoms of an arteriovenous aneurysm, the bruit, the pulsation, the congestion of the veins of the upper lids, the proptosis, and finally, the diminution of the exophthalmos by pressure on the internal carotid.

It reminded him of the only case he had even seen. A girl received a severe blow on the eye and orbit resulting in the symptoms mentioned. Dr. Keen tied the internal carotid with temporary relief. Soon the symptoms recurred in all their former intensity. He then tied the internal carotid of the other side. Edema of the brain was followed by fatal termination.

In his second case Dr. Holloway had so well described his own opinion that it was needless for him to repeat.

Dr. Sweet said that stereoscopic plates were made of both sides of the heads of each of the patients shown by Dr. Risley, and that he had carefully studied the plates with Dr. Manges. Although the history of one of the cases pointed to a fracture of the base of the skull, it was impossible to demonstrate from the plates any abnormal thickening or changes to point to an injury of this character.

Dr. Leonard Frescoln thought it would be advisable to keep in touch with cases of this character, inasmuch as autopsy reports were of the utmost value for the diagnosis and treatment of future cases.

Monocular Exophthalmos.

Dr. Sweet showed a case of monocular exophthalmos that he had examined with Dr. A. A. Sargent in the eye clinic at the Polyclinic Hospital. There was a history of a blow upon the eye with a large piece of coal three years previously, but vision was not affected until one year ago. At first there was some slight dimness in sight, and this gradually increased until light perception was lost. Ten months ago the eye became slightly more prominent than the other, and this has gradually increased since that time. Hertel's instrument records: R. E., 14 mm.; L. E., 29 mm. The downward and outward rotations of the globe were limited. No bruit could be detected. The ophthalmoscope showed complete optic atrophy, the retinal arteries thread-like, and the veins full and tortuous. Examination of the nose and throat was neg-

ative, and the diaphanoscope gave clear illumination of the sinuses and indicated no growth in the orbit. As the patient had only been under observation for twenty-four hours, no opportunity was afforded to have X-ray examination made. In view of the possibility of some orbital growth, the patient agreed to permit an exploration operation and removal of the eyeball if necessary.

Dr. Hansell said that his examination of Dr. Sweet and Dr. Sargeant's case led him to believe that we are dealing with some kind of a vascular tumor. That it is insignificant in size or located far back in the orbit was shown by the bright illumination of the orbit by the ophthalmodiaphanoscope. From this instrument held in the mouth the light traversed the antrums, showing them to be clear, passed through the floor of the orbit, through the anterior ethmoidal cells, illuminating the tissues around the ball and the interior of the ball. No large or dense tumor could exist in the anterior part of the orbit that would not obstruct the light as it was transmitted to the observer's eye. The attachment for the illumination of the frontal sinuses showed them also to be clear. The history of the case, the purely anterior proptosis, and the freedom of movement also militated against the diagnosis of a large or hard tumor.

Dr. Zentmayer thought that there was marked limitation of the outward and of the downward movements of the globe.

Dr. Holloway stated that this case suggested to him a patient who was under observation for a number of months at the University Hospital, and whose case history had been reported by Dr. de Schweinitz at the last meeting of the American Ophthalmological Society. This was a case of atypical pulsating exophthalmos, atypical in the sense that there was an absence of a bruit, and a subsequent operation showed the presence of a sarcoma of the orbit. Dr. Holloway felt that the symptoms present in the case under discussion were due to an orbital growth.

Dr. Risley thought that the symptom complex suggested a tumor of the optic nerve. If not that, a growth in the floor of the orbit extending to the apex.

Ocular Complications in a Case of Impetigo Contagiosa.

Dr. Howard F. Hansell recorded the case-history of a girl whose health was seriously broken down by typhoid fever, unwholesome food, and work. She confessed that while employed in a pickle factory she had devoured large quantities of pickles. The skin disease was distributed over almost the entire body, and consisted in the formation of pustules varying in size from that of a pea to a silver dollar. The ocular complications consisted in a chronic conjunctivitis with thickening and superficial vascular keratitis attended with the formation of ulcers. The course of the keratitis was variable but persistent. At one time the ulcerated area measured 4 mm. in diameter. The apices of the corneas were the centers of the inflammation. Here dense white patches of infiltration were always present and generally ulcerated. The opacity was densest at the apex and gradually shaded off into clear cornea before reaching the limbus. At no time were the irides involved, nor, so far as could be determined, the interior of either eye.

Dr. Leonard Frescoln stated that at one time preparation had been made to give the patient an intravenous injection of salvarsan, but a subsequent Wassermann test was negative. There are three skin conditions which give rise to ocular lesions—herpes zoster, often mistaken for erysipelas; pemphigus, a case of which was shown here last year by Dr. Shumway; and impetigo contagiosa, of which this is a rare example, with ulceration of the cornea.

Dr. J. Albert Morgan (by invitation) stated that he would not attempt to add any additional remarks to those already made by Dr. Hansell; however, he would keep in touch with the patient and would make a subsequent report at the time of the patient's discharge from the hospital.

Marginal Degeneration of the Cornea.

Dr. Zentmayer presented a case of marginal degeneration of the cornea. The patient was a married Italian woman, aged forty-five years, apparently in good health. She was first seen six weeks ago, when she complained of headache and of an uncomfortable feeling in the eyes.

In the cornea of each eye there was a groove about 2.5 mm. broad and about 0.5 mm. deep just inside of the limbus.

and involving, approximately, the upper half of the circumference. In the right eye the groove was broader and deeper, and at the nasal end of the furrow the floor was slightly bulging (beginning ectasia). By diffuse light it appeared almost transparent, but by oblique illumination, gray. Fine blood-vessels encroached upon it from the conjunctiva. The eyes were entirely free from evidence of inflammation.

The case was similar to, but more pronounced than, the one exhibited by Dr. Zentmayer at the Section last year.

Dr. Risley inquired if there was anything in the patient's general nutrition that might shed light upon the corneal condition.

Dr. Zentmayer said in reply that as far as the examination of the patient had progressed nothing of significance had been disclosed.

Meeting November 15, 1911. Dr. George E. de Schweinitz, President of the College, presiding.

No proceedings will be published for the November meeting, inasmuch as this was a combined meeting of the Section on Ophthalmology and the Section on Otology and Laryngology, and was held during the Congress of the Surgeons of North America. At this meeting the following papers were presented by visiting physicians:

The Surgery of the Sinuses and its Relation to Orbital Complications, by Joseph H. Bryan, M. D., Washington, D.C.; The Relation between Otitic and Intracranial Diseases, by Gorham Bacon, M. D., New York; The Newer Operations for Glaucoma, by John E. Weeks, M. D., New York.

These papers will appear in full with the other transactions of the Congress.

Meeting December 21, 1911. Dr. William M. Sweet, Chairman, presiding.

Migraine With Ring Scotoma.

Dr. Zentmayer presented a paper entitled a case of Migraine with Ring Scotoma. A manufacturer, aged forty years, had been sent to him by Dr. Fussell with a diagnosis of migraine with high arterial tension. Between the years 1883 and 1885 he had his first attacks of sick headaches associated with disturbance of vision. In these there had been a temporary loss of

vision, preceded by a scintillating wheel scotoma in each temporal field. In 1889 he had the first attack of bilateral hemianopsia, probably left lateral. In the last year, particularly in the last six months, he has had almost daily attacks of migraine. Dr. Fussell's examination showed accentuation of the second sound of the heart with heart dullness extending somewhat to the left. The systolic blood pressure was about 185.

There was a low compound hyperopic astigmatism with convergence insufficiency. On June 2, 1911, the visual field of O. D. presented a negative absolute ring scotoma 10 degrees in width situated between the limits of the form and red fields and exactly concentric with the limits of the form field. The visual field of O. S. presented a similarly situated temporal hemianopsic ring scotoma. Five days later the right eye presented a temporal hemianopsic ring scotoma corresponding exactly with the temporal half of the original full ring scotoma; and the field of the left eye showed a breaking up of the original hemianopsic ring scotoma, leaving four dark islands varying in size from 15 to 20 degrees.

On December 18 the visual fields were normal. Since wearing the correcting lenses, the sick headaches occur only occasionally, but at times he still has attacks of dizziness accompanied by the bitemporal scintillating scotoma.

The ring scotomata were probably due to vasomotor disturbances of the retinal circulation, whereas the homonymous lateral hemianopsia was due to occipital cortical vascular disturbance.

Pigmentary Retinal Degeneration With Ring Scotoma.

Dr. H. Maxwell Langdon reported the case-history of a patient with pigmentary retinal degeneration with a ring scotoma in the right eye, and a beginning similar scotoma in the left eye. After mentioning the various theories advanced to explain the formation of ring scotomata, special attention was given to the vascular and the nerve theory. Instances were cited where ring scotoma had been associated with accessory sinus disease, glaucoma, migraine, and in consequence of lightning stroke.

In the discussion of the papers of Drs. Zentmayer and Langdon, Dr. Crampton referred to the case of a young boy who had retinitis pigmentosa and whose visual fields when

taken on a dull day showed isolated scotomata arranged in an irregular circle. When examined on a bright day the islands coalesced, forming a large arc of a circle.

Keratitis Rosacea.

Dr. Burton Chance reported the history of a case of Keratitis Rosacea in a man, aged forty-two years, whose eyes had been more or less affected for sixteen years. The disease of the skin had lasted since he was eighteen, and was subject to remissions and exacerbations, particularly in the spring and autumn seasons. The first ocular symptoms were the formation of styes and congested eyelids. Later the eyes became affected. No special study was made or treatment given until he consulted Dr. Chance twelve years ago. Since then he has had several attacks, though he reported most irregularly for treatment. The skin lesions had become pronounced; the ocular lesions consisted of marked glandular involvement and of infiltration of the corneæ. The corneæ showed broad opacities in the subepithelial tissues with scattered areas nearer the peripheral parts. The vascularity was intense. There was at no time any tendency to ulceration or perforation of the cornea, nor were the irides involved. At present there is quiescence of all the inflammatory symptoms, the lids are healthy, and the corneal peripheries are clear, the opacities occupying the fissural portion of the cornea. Dr. Chance does not look upon the disease as phlyctenular in type, but is inclined to regard it as being due to the trophic changes in the terminal nerves of the cornea induced by injury from the heavy lids. Because the patient remained under treatment for the last three months, the disease of the skin is practically cured. The case did best when zinc lotions were used for the eyes and a solution of zinc sulphate with potassium sulphurate was used on the skin. Holocain solution was of great value for the cornea, and a rice diet best for the patient's well being. The skin is regaining a healthy tone from repeated exposures to the X-rays.

Dr. Holloway stated that Dr. Chance's patient was interesting from several points of view: that the patient was a male, whereas the majority of the patients affected by this condition are females. Further, in the majority of the cases that have shown extensive subepithelial opacities the portion of the

cornea that has been involved has been the lower half, although in one case that he could recall the upper portion of the cornea was the part affected. Fortunately, in the case that was observed by him, only one eye showed extensive corneal involvement, while the other eye showed a number of small efflorescences about the limbus, which bore a clinical resemblance to phlyctenular disease, although as elsewhere pointed out, the age of the patient and the associated acne would exclude such a diagnosis. In another case that had been seen by him through the courtesy of another member of the Section, the bulbar manifestations were unilateral, the lower portion of the cornea being involved, but less extensively than in the patient whose case history had been reported by him. Zinc seemed to be highly efficient in clearing up the lid conditions.

Dr. Crampton mentioned a case of rosacea keratitis which came to him shortly after Dr. Holloway had called attention to the condition by reporting a case which he had studied. The cause of the keratitis had long been unrecognized, although it had recurred several times coincident with mild attacks of acne rosacea. The lower portion of the left cornea was alone affected and showed a marked vascular tendency. Cure was rapid after the adoption of a course of local and systemic treatment suggested by a dermatologist, together with the usual remedies directed to the corneal condition.

Dr. Chance said that he had hoped Dr. Holloway would have offered some suggestion as to the causation of the disease of the cornea. He stated again his belief that in this case the involvement of the cornea represented neuropathic change and was not directly an element of the general acne, for the symptoms seemed to progress as long as the lids remained heavy and congested, and subsided whenever they became thin again. While not disputing Dr. Holloway's reference to the likeness to phlyctenular eruptions in the early stages, his intimate and rather prolonged study of his own case led him to believe that it is not phlyctenular. Dr. Chance said in view of the comparative rarity of the disease he wished to mention two additional instances of it. Several days ago, after an interval of five or six years, a lady returned for a change of glasses, when it was noticed that a rather faint roseola noted years ago had become a distinct acne with involvement of the glandular elements to a pronounced degree. The tarsal glands

were decidedly congested and prominent even to the positive formation of a chalazion; and today, at the end of the clinic hour, a woman was assigned to him presenting well marked acne rosacea with an area of corneal infiltration directly at the summit which did not look at all like a corneal phlyctenule. In this case also the tarsal glands were very prominent.

Streptococcic Bacteremia With Panophthalmitis.

Dr. H. F. Hansell cited the following history of a man, aged 46 years, who died after three days' illness from streptococcic infection. He had consumed large quantities of alcohol during the last twenty years and was in a dilapidated state of health when admitted to the Philadelphia General Hospital. He complained of pain and swelling in both knees and ankles which he considered were due to rheumatism. The right eye became acutely inflamed. The iris was muddy and discolored and simultaneously with or immediately after the iritis had commenced the anterior chamber became almost filled with a filmy, opaque membrane. The membrane of Descemet was covered with grayish deposit and the cornea propria infiltrated and opaque. The eye became entirely blind and almost immobile; all the signs of violent purulent panophthalmitis were present. The left eye remained unaffected. Pus obtained by puncture of the prepatellar bursa revealed myriads of streptococci.

Postmortem examination showed chronic interstitial nephritis, small and hard liver, chronic mitral valvulitis and aortitis, engorged vessels of the dura mater and pia mater, and streptococci in the culture made from clots removed from the anterior cerebral vessels.

Macroscopic examination of the eye: Anterior and vitreous chambers filled with purulent material, distended and tortuous vessels in the sheath of the optic nerve, especially in a focus about one-half inch from the globe. Microscopic examination: Diminution of the number of axis cylinders in the optic nerve, disintegration of the white substance of Schwan; choroidal vessels engorged and some of them blocked, and small round-cell infiltration between the blood vessels. No streptococci could be found.

Metastatic Gonorrheal Iritis Treated With Neisser Bacterin.

Dr. Edward A. Shumway showed a patient from the wards of the Philadelphia General Hospital, who had recovered from a severe attack of bilateral gonorrheal iritis after treatment with Neisser bacterin. The patient, a male, aged twenty-five years, had had four recurrences in five years, and had an associated arthritis of the hip joints. An injection of a dose of 50,000,000 organisms was followed by decided improvement, and a second one of 100,000,000, which was administered one week later, produced still more prompt response. All photophobia and pain disappeared, and after two subsequent injections of 200,000,000 and 300,000,000 respectively the ciliary flush cleared up entirely and the eyes remained quiet. No other general treatment had been given. Dr. Shumway said that since he had reported a similar case before the Section in February, 1910, the papers which had been written had tended to confirm the results collected at that time, viz., that the injections were of but little avail in gonorrhea of the urethral tract and the immediate adnexa, and in gonorrheal conjunctivitis, but that they had proved very serviceable in metastatic involvement of the joints and iris. Recently, however, Palmer, of New York, had reported some success in acute gonorrhea and in gonorrheal ophthalmia. Uhle and Mackinney, of Philadelphia, believed that the serum was more effective than the bacterin. A minor disadvantage of the use of the serum was the occasional occurrence of urticaria after the injections. This serum disease had been noted in two out of three cases of metastatic iritis reported in *The Ophthalmoscope* for December, 1911, by T. Harrison Butler.

Dr. Posey said that from an experience with the gonorrheal vaccines which he had recently had in five cases of gonorrheal iritis he was as yet unconvinced as to their value. In two of the cases an effusion had occurred into the anterior chamber about forty-eight hours after the patient had been inoculated with 50,000,000 of the gonococci. While he had observed similar effusions in other cases of iritis in which no vaccines had been used, its occurrence in two cases so soon after the injection seemed to indicate that it was dependent upon them. The effusions disappeared in about a week's time without complicating the future perfect convalescence, but he could not say that the injections had shortened or mitigated the

seriousness of the attack. In two of the remaining three cases, both of which were initial attacks and occurred in young subjects, no effusions occurred after the vaccines had been administered and convalescence was speedy. As other remedies were applied, however, he could not attribute the favorable course entirely to the vaccines. The vaccines were employed in the fifth case in as high a dose as 1,000,000,000 of the gonococci to produce immunity from future attacks in a man who had suffered successive attacks of iritis each year over a period of ten years. Notwithstanding the presence of synechiæ, not the slightest reaction followed any of the injections.

While Dr. Posey said that no blood culture had been made to establish the gonorrheal origin of the iritis in any of his cases, all had suffered from a urethritis at some previous time, and all had had arthritis.

Dr. Mary Buchanan (by invitation) referred to a virulent case of gonorrheal ophthalmia in a woman, aged fifty-one years, innocently infected; in which after silver nitrate, argyrol, and irrigations of bichlorid solution in the hands of a colleague had failed to control the discharge, injections of Neisser bacterin had been used in conjunction with the usual treatment. When first seen on the twelfth day the left cornea was completely destroyed, as was the right, except for a small sector to the inner side.

Mulford's Neisser bacterin in the dose of 1,000,000,000 organisms was injected subcutaneously on the fourteenth day, with some diminution of pus and no systemic symptoms. Twenty-eight hours afterward 2,000,000,000 organisms were injected with a drop to 97.4° in temperature, and the development of headache, pain back of the eyes, and tingling of the fingers. In twenty-four hours the pus was diminished in quantity, and was thinner; by forty-eight hours it had become watery and had almost ceased. After five days, as there was still some discharge, another dose of 1,000,000,000 organisms was injected with decided effect, although gonococci were present until the twenty-ninth day of the disease.

Dr. Buchanan thought it was a question how soon the secretion would have stopped under energetic local treatment alone, but by carefully watching the case she was convinced that the bacterin did good each time it was injected, and without harm-

ing the patient by the enormous doses. Dr. Adelaide Peckham advised using it, and thought it nonsense to say it was of service in metastatic but not in acute conditions because the germ is the same. Dr. L. H. Bernd claims to have had success in treating acute genitourinary conditions with Neisser bacteria in enormous doses, but has never reported the details of his case.

In conclusion, Dr. Shumway said that no reaction, either local or general, had been observed in his patient.

Antral Disease in a Four-Months-Old Child.

Dr. Krauss reported the history of a case of antral disease with marked orbital symptoms occurring in a four-months-old child. The child's birth was normal. When the child was one month old it had a severe cold, but made an apparent recovery. One week before admission there was a recurrence of symptoms, with swelling of the eyelids and face.

On admission the temperature was 100° F. The left side of the face was greatly swollen, with much edema of the lids. The left eye was greatly proptosed, with ocular movements greatly restricted. Down and out in the orbit there was an appearance of tumor suggesting inflammatory origin. The nasal mucous membrane was much swollen, showing much pus, especially in the left nostril. Examination of the mouth showed mobility of the palatal plate of the superior maxillary bone. In the alveolar process of the superior maxilla on the left side, at about the site of the first bicuspid tooth, was a minute granulating spot which upon probing exuded pus rather freely. With but slight effort a grooved director was passed along the sinus to the sinus maxillaris, and upon enlarging the opening with a curette, the bent probe could be passed through the outer part of the orbit into the tumor then presenting. Much free pus was evacuated. After making a counter opening into the nose, the cavity was washed freely with boric acid and packed with iodoform gauze.

In curetting the sinus, two large well developed teeth were brought forth. Each tooth measured approximately one quarter of an inch in length and was quite hard.

Treatment consisted of daily washing of the sinus followed by packing with iodoform gauze. Later, on account of continued loss of weight and refusal of food, a packing wet with

a weak bichlorid solution was substituted. The swelling rapidly disappeared. There was some exfoliation of small fragments of bone. No incision into the orbit was made until several weeks later, when a small sluggish abscess, which had remained, was opened, the drain being removed in two days.

Onodi has shown the presence of practically all of the sinuses in the first year and has demonstrated that the antrum in the first year of life varies from 5 mm. to 19 mm. long, 3 mm. to 9 mm. high, and 3 mm. to 8 mm. broad.

Dr. Posey said that he had observed three cases in the Children's Hospital which closely resembled that reported by Dr. Krauss. All had had unilateral exophthalmos, from pus in the orbit, and in all there was evidence of a carious condition of the superior maxillary bone. In the first two there were sinuses in the floor of the orbit, at the angle of the jaw and in the buccal cavity, while in the last, which was under his care at the present time, he had recently incised a collection of pus in the hard palate and had removed several loosened teeth from a carious jaw. He had considered these cases as instances of an osteomalacial disease of the superior maxillary, dependent upon some general dyscrasia, and had not thought of their being dependent upon antral disease. Indeed, until he had heard Dr. Krauss' explanation, he had never considered it possible that the antrum could be the seat of inflammation in such a young subject.

Dr. Krauss, in closing, asked Dr. Posey for the ages of the patients spoken of by him. The special points of interest in Dr. Krauss' case was the extreme youth of the patient, slightly over three and one-half months old, and the possibility of antral disease at this time of life. He emphasized the fact that much has been learned in the recent past regarding the presence of nasal sinuses in very young children, to disprove the thought formerly prevalent that they are a later development of child life.

Dr. Posey stated that he thought his cases ranged from one to three years of age.

Atrophy of the Iris With Polycoria.

Dr. Charles R. Heed exhibited a patient with polycoria resulting from atrophy of the iris. The patient exhibited evidences of a chronic iridocyclitis, with the following sequelae:

Occluded and secluded pupil; secondary glaucoma; atrophy of the iris with polycoria, and evidences of beginning ciliary staphyloma. The primary condition was probably luetic in origin.

Dr. G. E. de Schweinitz exhibited a water color sketch illustrating similar iris conditions.

Meeting January 18, 1912. Dr. William M. Sweet, Chairman, presiding.

Obstetric Injury.

Dr. Posey presented a case of obstetric injury to the eye. A patient, a man, aged twenty-three years, presented a vertical scar at the outer canthus, and atrophy of the optic nerve. His mother stated that the labor had been a prolonged one, that forceps had been used and that the tissues at the outer part of the eye were much swollen for three months afterward. Dr. Posey was inclined to attribute the atrophy of the optic nerve to an orbital cellulitis and not to avulsion at the time of the labor, as he thought in the latter event that the external rectus muscle would have been palsied, whereas it now acted normally.

Juvenile Tabes.

Dr. George E. Price and Dr. Charles E. Shannon reported the case history of a girl, aged fourteen years, with juvenile tabes and double primary optic nerve atrophy. Up to the age of eleven years the patient enjoyed good health. From that time her vision began to fail and at the end of two and one-half years, despite treatment, her sight was almost totally destroyed. Ocular examination showed the following facts: Pupils unequal, pupillary reflexes absent. The ophthalmoscope revealed almost complete primary atrophy of both discs. The fundi were in other respects healthy. The neurologic examination showed slight ataxia of upper extremities; weakness of the bladder sphincter, with absence of the petella tendon and Achilles tendon reflexes. There was neither ankle clonus nor Babinski sign, and no hysterical stigmata. Dr. E. Burville Holmes reported a positive Wassermann reaction. Examination of the cerebrospinal fluid by Dr. George F. Lull revealed an increased amount of albumin but no lymphocytosis. On examination of the family history it was found that the

mother had led an immoral life prior and subsequent to marriage. She had one miscarriage. Father's history negative.

The subject of tabes in the young presents many interesting features, among which should be mentioned its extreme rarity, infrequency of marked ataxia, the usual presence of optic atrophy, and the fact that females are affected more often than males. Although cases have been reported as resulting from acquired lues, transmitted syphilis is the usual cause, and the age of its appearance is usually about fifteen years.

Dr. Howard F. Hansell said that it was not with the purpose of contesting the diagnosis, or even with the assumption that this patient was not suffering with juvenile tabes, that he asked the authors whether they had considered, in their careful analysis of the symptoms exhibited by this patient, the possibility of tumor of the pituitary body.

The total atrophy of the optic nerves; the size of the pupils, midway between contraction and dilatation and both irresponsive to light or attempts at accommodation, and the paralysis of the superior oblique of the left eye, are, it is true, not distinctive of pituitary disease, but they may be explained by gradual enlargement of that gland and slowly advancing pressure upon the chiasm. Curiously, the patient has photophobia when exposed to ordinary daylight, explainable only on the ground of irritability of the fifth pair, a not uncommon symptom of pituitary disease. The loss of knee jerks and the incontinence, while not conclusive, however, strongly support the diagnosis of infantile tabes.

Dr. Langdon stated that so far as the pupillary condition was concerned it seemed to point to an optic atrophy accompanying tabes rather than one from some intracranial growth, since in the latter the blindness would produce pupils which were widely and equally dilated and nonresponsive to light, whereas the pupils in this case were only moderately dilated and were unequal.

Dr. Price in closing the discussion said that he was not surprised that Dr. Hansell should raise the question as to the diagnosis, owing to the rarity of the condition. When first seen the case suggested the possibility of insular sclerosis, but this was eliminated on account of the absence of the characteristic symptoms and the presence of the Wassermann reaction. Dr. Price did not consider the diagnosis of a pituitary tumor

probable for the following reasons: There was no papilla edema; no nausea or vomiting; no hemianopsia; no symptoms of acromegaly or of infantilism, the patient having menstruated regularly since she was thirteen years of age; and lastly, the presence of urinary incontinence indicating a spinal lesion. The diagnosis he believed rested between cerebrospinal syphilis and juvenile tabes. The fact that the optic atrophy was primary and the patient had no headache for two years was against cerebrospinal syphilis. Her present headache did not prevent her from sleeping well, and we all know that the headache of syphilis is intense and worse at night. Moreover, her clinical symptoms were those of juvenile tabes and not such as we usually see in lues of the nervous system.

Primary Intradural Tumor of the Optic Nerve.

Dr. G. E. de Schweinitz described the case history of a patient with primary intradural tumor of the right optic nerve as follows: The patient, a boy, twelve years old at the time of operation, presented nothing of importance in his family history, but when he was between his third and fourth years had suffered from convulsions; one convulsion also occurred in his sixth year. Exophthalmos was first noted when the child was about five years of age, and gradually increased, with progressive atrophy of the optic nerve without preceding neuritis or choking of the disc. X-ray examination indicated absorption of bone or bulging of the walls of the orbit outward, but nothing else. The eyeball was displaced forward and downward, and Hertel's instrument recorded 30 mm. At the operation a neoplasm, not unlike the shape of the eyeball itself, was found growing from the optic nerve, with a small portion of uninvolved nerve between the anterior part of the growth and the posterior portion of the eyeball. The growth was dark red in color, entirely encapsulated, 3.5 cm. in length, 2.5 cm. in width, and 3 cm. in depth. On section it was seen that the tumor proceeded from the nerve in a fan-shaped area and was entirely covered by a dural capsule. It was composed, in general terms, of a connective tissue, through which were scattered numerous nuclei, together with swollen and edematous nerve fibrils. In some of the sections cells exactly like ganglion cells were present. A neuroglial hyperplasia was not demonstrable. Either the growth had begun in very early life, or more probably it was congenital.

Seven months after operation, at the time of report, there had been no recurrence, nor were there any signs of intracranial involvement.

Dr. Langdon stated that in the *Transactions of the Ophthalmological Society of the United Kingdom* there were reported four cases of optic nerve tumors, three by Hill Griffith, one extradural and two intradural, and an extradural one by Arthur Benson. In opening the discussion of the former paper, the president, Mr. Berry, expressed his surprise at the possibility of there being such a division as intra- and extradural tumors of the optic nerve, apparently not considering the dura as part of the nerve. Mr. Collins and Herbert Parsons both said the division was a proper one, inasmuch as some growths sprang from the outer layers of the dura itself. Mr. Parsons referred to Byers' paper, which Dr. de Schweinitz has mentioned, and agreed with him and Collins that nearly all the intradural tumors were a form of fibrous growth, which he called "fibromatosis," even though they were reported under such titles as myxomata, gliomyxomata, sarcomata, and myxosarcomata; of the 18 extradural growths that have been reported, nearly all were endotheliomata, as was the case reported in the same volume by Benson.

Dr. Sweet had hoped to give a complete report at this meeting of the case of exophthalmos recently exhibited before the Section, as there was found upon operation an intradural tumor presenting the same appearance as that shown by Dr. de Schweinitz. The tumor began at the optic nerve, 7 mm. back of the globe, and measured 39 mm. long and 25 mm. at its greater curvature. The exact character of the tumor had not as yet been definitely determined.

Amblyopia Following Hemorrhage From the Stomach.

Dr. Zentmayer presented a case of amblyopia following hemorrhage from the stomach. The patient was a man, aged thirty-six years. He had suffered from gastric catarrh for six years and this culminated in a severe hemorrhage, estimated by the patient at a pint, followed by a smaller hemorrhage one week later. Almost immediately after the second hemorrhage vision began to fail. Nine weeks later vision in O. D. 6/90; O. S. 6/6. The visual fields are greatly contracted, the lower half of the right field including fixation

and almost the entire lower half of the left field being completely gone. Both optic discs are atrophic, the margins and the lamina cribrosa being distinct. The arteries are somewhat contracted.

Dr. Weisenburg had found a history of girdle pains, a weakness of the lower part of the face, with protrusion of the tongue to the left and lessened action of the left palate and ataxia of the left upper limb. He thought that from the multiplicity of the symptoms that it was possible that the patient had cerebrospinal lues, and suggested the Wassermann test.

Dr. Sweet referred to a case of optic atrophy following intestinal hemorrhage that he had exhibited to the Section about ten years ago. The man was a healthy individual, aged fifty-five years, the driver of a dray, who was attacked by vertigo on his way to work. The dizzy and muscular weakness compelled him to return home and go to bed. The same evening he took a large dose of calcined magnesia, and during the night had a large movement of the bowels, which almost filled the two-quart receptacle, and was found next morning to consist almost entirely of clotted blood. Later in the day there was another bowel movement, almost equal in quantity to the first, but the blood was brighter in color. On the morning of the sixth day the vision became blurred, and by evening there was loss of perception of light in the left eye, and only light perception in the right eye in a small area to the right of the fixing point. Ophthalmoscopic examination showed the optic discs pale, the nerve margins slightly hazy, the retinal arteries moderately contracted, the retinal veins full but not tortuous, and the retina edematous. From the lower portion of the disc of the right eye a cilioretinal artery passed toward the fovea.

Examination of the abdomen failed to show any areas of dullness or tenderness to account for the hemorrhages. The blood examination showed hemoglobin, 38 per cent.; red corpuscles, 2,088,000, and white 20,900.

The case was under observation for a period of four years. During this time there was no return of vision in the left eye, and only a slight increase in the size of the preserved field in the right eye, which was about 15 degrees wide and extended temporally from the fixing point to the 40 degree line on the chart.

Although the result of experimental studies points to degeneration of the retinal ganglion cells, secondary to abnormal changes in the blood acting on the vasomotor system, as the cause of the blindness, there would appear to be some other factor in many of the cases. The preservation of a small area in the field in the right eye of the case mentioned may have been due to an anastomosis of the cilioretinal blood vessel, although the factors which caused the constriction of the central retinal vessel and its branches would apparently have exerted a similar influence upon this artery.

Dr. S. D. Risley said it was difficult to believe that such profuse hemorrhages from the alimentary tract as reported in the cases referred to by Dr. Zentmayer and Dr. Sweet could have occurred in perfectly healthy persons, and he inquired as to the presence of retinal edema when the cases were first seen. Commenting upon the admirable picture of the fundus shown in Dr. Sweet's case—he said the appearances were those he had come to regard as the classical ophthalmoscopic picture of high blood pressure in the early stages of cardiovascular disease, resulting from autoinfections or toxemias. The large, dark veins, tortuous to the limits of the ophthalmoscopic fields, were present in the illustration, notwithstanding the fact that the painting was made after the subsidence of the edema present in the acute stage. The appearance of the general fundus was also that so often seen when the infiltration in the fiber layer of the retina had been absorbed. One of the most common sources of such systemic poisoning was the alimentary tract—especially the colon. Dr. Risley thought it would be interesting to ascertain whether these patients had been chronically constipated or had suffered from diarrhea alternating with constipation.

Dr. Langdon said that it seemed impossible that healthy individuals should have sudden, profuse hemorrhages, but that individuals "apparently" healthy have them is an undoubted fact; as an example, the case of a physician, in the early thirties, might be mentioned, who has had two profuse hemorrhages from the digestive tract, almost two years apart, with no unusual symptoms preceding either hemorrhage. He has been studied by numerous internists, including such good observers as Drs. David L. Edsall and D. J. McCarthy, with practically negative findings, the final diagnosis resting be-

tween an ulcer of the stomach or duodenum and a relaxed condition of the mucosa with engorgement of the vessels.

Dr. Ziegler stated that some years ago he had presented before the Section a patient with hemorrhages in the eye resulting from dysentery, such being the case he did not see why we could not have a hemorrhage into the nerve itself.

T. B. HOLLOWAY, *Clerk.*

CHICAGO OPHTHALMOLOGICAL SOCIETY.

Regular meeting, held December 18, 1911. The President, Dr. H. W. Woodruff, in the Chair.

Treatment of Corneal Abscess by an Old-Time Surgical Procedure.

Dr. H. B. Young, Burlington, Iowa, reported the case history of a woman, forty years old, who, during a convalescence from smallpox, contracted an abscess of the cornea. Conservative measures failed to give relief, and even the actual cautery did no more than control the trouble for a few days. Curettage and the application of ninety-five per cent phenol gave only temporary relief. Finally, he made a crucial incision as for carbuncle, and applied the phenol thoroughly. Convalescence promptly followed. The resulting scar is small and thin.

A Case of Amblyopia of Obscure Origin.

Dr. Young also reported the case history of a man, aged forty-six, whose vision became dim following an attack of grippe. The right eye is weaker than the left. Tension is normal; there is no tenderness or inflammation. Form fields are not restricted, but the color sense is defective to the point of abolition in the right eye. He had a venereal infection twenty years ago, but otherwise his history is negative. Intestinal toxemia was suggested as a possible cause, but the etiology is indefinite.

Discussion.—Dr. J. E. Colburn has always had good success following the use of phenol with or without curettage, although he has never used the knife. He has found the actual cautery sufficient.

Dr. H. S. Gradle stated that he found the nerve in the amblyopia case absolutely white, as in a primary nerve atrophy. In the retina and choroid are minute white areas, as in a retinitis punctata. Here and there these areas are coalescent. They occur mainly at the side of the blood vessels, and are scattered about the macula in a circular fashion.

Dr. Young stated that while the nerve looks whiter than one

would expect to see it, he could not make a diagnosis of atrophy without some limitation of the form field. The man probably had a venereal infection which was more extensive than would appear, and he thought that there might be developing a secondary cerebral disturbance.

In regard to the abscess of the cornea, he believed that when the lesion is more or less burrowing in character, curettage is a very unsatisfactory treatment. One must go through to the solid tissue, apply the phenol to the entire necrotic area, both the visible portion and the invisible portion under the edges to get good results. He thought the treatment was much less radical than a Saemisch section.

Nystagmus.

Dr. Eugene R. Lewis, of Dubuque, Iowa, discussed the physiology of nystagmus and also its significance as a symptom in disease. He recognizes a vestibular, a cerebellar and an ocular type. Regarding the latter, he has evolved a new theory concerning the development of the symptom. He holds that as cerebral development proceeds, cerebral activities increase, and the increasing activity in the oculomotor centers not being checked by inhibitory cortical impulses, finds expression in nystagmus of the ocular type. This nystagmus is undulating, uninfluenced by the usual voluntary eye movements, does not cause apparent movement of fixed objects, and is always associated with low visual acuity.

Discussion.—Dr. Clark W. Hawley called attention to a singular coincidence of hereditary nystagmus. All of the boys in the families of all of the sisters have nystagmus. None of the girls in the families of the sisters have nystagmus. There are five sisters who have boys and girls. In the families of the brothers of these sisters there is no evidence of nystagmus.

Dr. George F. Suker did not agree with Dr. Lewis as to the origin of ocular nystagmus. It might, he said, be caused by defects, such as those he mentioned, but there undoubtedly is a pure ocular nystagmus which he did not mention and which might be classed as a pseudonystagmus, due to diseases of the central nervous system. It is not a complete nystagmus, seldom rotary, but always limited to one-half of the extent of lateral rotation, and the eye swings from its position to the central line without crossing it. There is seldom a defective

refraction media, but ocular disturbance is not associated with labyrinthine or cerebellar disease. It comes on usually in the beginning of multiple sclerosis and senile dementia or general paresis, and is of great value from the diagnostic standpoint.

Dr. H. Walker has seen a case of purely voluntary nystagmus occurring in a man. There was no pathologic change in the eye, and no disease of the brain, the man being normal in every way. He asked Dr. Lewis in which classification he would put such a case.

Dr. H. W. Woodruff recalled two cases of that kind which had been presented before the Society.

Dr. Lewis stated that the condition Dr. Suker described would be more properly grouped under false nystagmus, for the reasons which he gave. The symptoms of this condition are sometimes of one kind and sometimes of another, but they are dependent on some deviation in the nervous mechanism, and the fact that it is the ocular muscles which are affected should not lead one to classify them in a category where they do not belong. As to what the voluntary control over the ocular muscles might mean, he was not prepared to say. One would have to know what the individual case was, because there might be some peculiar individual control over these muscles similar to the control of the ear muscles, but that does not necessarily mean that there is a chorea of the ear. In the development of nystagmus of the ocular type which one can recognize by the absence of apparent movement of fixed objects, that is not true of the kind of movements which Dr. Suker referred to, where the condition is of cerebellar origin. In movements of the eyeball without apparent subjective movement of the fixed objects, it is difficult to give an explanation for it. The only way one can grasp this is by development. Instead of developing in the sensorium or a point in the retina, you develop a line in the retina.

Cases of Trachoma Treated by the Jequirity Method.

Dr. Clark W. Hawley reported the histories of four cases of trachoma treated with jequirity: one patient being presented before the Society. The results of the treatment in all cases have been good, in one case the result was most brilliant. In all cases the improvement continued for many months. The patient presented at the meeting was a woman 30 years old who

had trachoma for a number of years and had been treated by a number of oculists in the usual way with but little success. When first seen there was an extensive bilateral pannus and a number of trachomatous ulcers of the left eye and one large ulcer in the center of the right cornea.

Dr. Hawley usually treats the eye about five o'clock in the evening so that by the following morning some results are observable. If no inflammatory condition is manifest, the jequirity is repeated the next morning. The lids are enormously swollen and the discharge very profuse. Great care is taken in washing the eye thoroughly every hour; at first applications of cold for about twenty-four hours, and then applications of hot water for two hours at about twenty minutes at a time, until the swelling and inflammation have subsided. The subsidence of the inflammation and swelling continues for about a week, and at the end of another week the lids are practically normal, the cornea becomes quite clear and the improvement in vision was commensurate with the result.

Slides of Tarsal Conjunctiva Trachoma.

Dr. L. N. Grosvenor presented slides of a typical trachoma follicle, a follicular cavity, the papillary form of trachoma, cystic mucoid degeneration and several cases of fibroid changes.

Discussion.—Dr. E. R. Lewis of Dubuque, Iowa, asked Dr. Hawley whether he would recommend the jequirity method in a case of persistent granular ulceration with vascularization of the cornea in a tuberculous youngster, fourteen years of age, who had phlyctenules which have resisted every other kind of treatment.

Dr. George F. Suker has seen some of Dr. Hawley's cases and reported the results as being wonderful. He said that many years ago his chief had been in the habit of using jequirity in about the same way as Dr. Hawley used it, and he had had many years of experience with trachoma. He never used the cold application until he thought there was sufficient swelling and inflammation to necessitate canthotomy, and he never thought he had a good result until he had a thick membrane of pseudodiphtheritic type; in fact, the thicker the membrane, the better the result. Furthermore, if the inflammatory condition subsided inside of a week or ten days and the cornea was not clear, he again applied the jequirity. He applied it direct, so

as to get a violent reaction, and therefore he never failed to get the pseudodiphtheritic membrane. He insisted that the jequirity be washed before it was used. He never paid any attention to the corneal ulcer. It invariably cleared up nicely, and there was no fear of perforations. The thing to guard against is to get the jequirity pure. The bean is apt to be impure and contain substances which are dangerous. The impalpable powder is not irritating as a foreign substance. It readily absorbs the lacrimal secretion and becomes pulpy, while the foreign ingredients remain there as irritating bodies and cause a reaction which is not produced by the jequirity.

Dr. E. La Mothe has had quite an experience with the jequirity method in a clinic in Paris. An oculist in that city, he thought, was the originator of the method, but he did at one time think of discontinuing its use because in several cases he could not control the reaction. Perforation of the cornea followed. Dr. La Mothe thought it wise to follow the new method of Romer, who makes a solution of jequirity in three different strengths, beginning the treatment with a weaker solution and using the stronger if a sufficient inflammatory reaction is not obtained. He also uses a serum from an immune horse. With this serum he controls absolutely the most severe inflammatory reaction following the use of jequirity in from four to six hours.

Dr. Schneider inquired whether setting up an acute inflammation on top of the chronic inflammation was not the essential principle in the use of jequirity, and would any other substance which produced a like reaction answer the same purpose? The same line of treatment is followed in the case of a skin lesion where a chronic inflammation is converted into an acute inflammation, and then the latter is treated. He also inquired whether anyone had tried the use of the gonococcus for the purpose of setting up an acute inflammation? He thought that the jequirity method of treatment was too severe and he certainly would not allow anyone to use it in his eyes.

Dr. L. N. Grosvenor pointed out that the idea is to set up a phagocytosis, and therefore the more acute the inflammation, the better the result. In trachoma there is no phagocytosis, hence the necessity of setting up the acute inflammation, and that is the foundation of the jequirity treatment and of the acute gonorrheal infection.

Dr. Hawley said he did not have any experience with cases such as those mentioned by Dr. Lewis. If the patients were willing to submit to the treatment, he would do what he could. As to doing harm, he had not the slightest fear of losing vision. He does not try to control the inflammation; the more reaction, the better. The cold is used only to alleviate the pain and not to control the inflammation. In none of his cases has he had reason to worry because of the inflammation or excessive swelling. Only twice has he had to use the jequirity more than once, and then only because he did not use enough the first time. There has been no return of the trouble in the first case after five years.

A Case of Interstitial Keratitis of Acquired Luetic Origin.

Dr. Carroll B. Welton, Peoria, cited the case history of a woman, aged nineteen, who complained of pain, failing vision, photophobia and lachrimation. She also suffered from insomnia, because of pain, reflex blepharospasm and sneezing. The right eye showed ciliary congestion and a ground-glass appearance of the cornea, the deeper layers showing a grayish infiltration consisting of spots enmeshed in a network. Vascularization of the cornea was present, more in the right than in the left eye. The iris was invisible. Iridocyclitis was present. A very faint reflex was present in the right eye. Fundi indistinct and anterior chambers deep; tension normal. Vision of the right eye, hand movements at two feet; left eye, shadows. The patient denied syphilis; the tuberculin test was negative. Treatment consisted in protecting the eyes against light; hot applications and instillation of dionin and atropin; potassium iodid internally. Improvement gradual, but steady. The lesion was typical of syphilis.

Discussion.—Dr. Mortimer Frank did not regard the condition as being a rare one. As was pointed out by Dr. Wilder in a paper read before this Society some years ago, the cases are not reported because the condition is believed to be rare. He has had several cases, and has a patient under observation now—a young boy. Dr. Welton, he said, failed to mention whether a Wassermann test had been made. Although a negative result does not mean anything, a positive reaction is significant. The test should always be made.

Dr. Suker inquired how soon after the tuberculin injection

improvement was noted; and how long before mixed treatment was begun.

Dr. R. J. Tivnen wanted to know what tuberculin test was used.

Dr. H. W. Woodruff thought that the point the Doctor wanted to bring out particularly was whether this was a case of acquired or hereditary syphilis. He failed to see that the argument presented was in favor of one more than the other, because interstitial keratitis of the type described is common in hereditary syphilis and yet it is lacking in other essentials, so that it would be wrong to place the case in that category.

Dr. Welton, in closing, speaking of the rarity of these cases, said that they are rare only because they are not reported, but such cases usually occur in the very young. The discussion held at the time Dr. Wilder read his paper was to the effect that quite a few cases had been seen, but only twelve had been reported. Up to 1908 one hundred cases of the acquired form were reported in the literature. He did not make a Wassermann test in this case, because the patient could not afford to come to Chicago to have it made, and there were no facilities in Peoria for making it. As to the tuberculin, it was given three times, 0.5 mg. the first time, 1.5 the second time, and 2.5 mg. the third time, of the serial dilution No. 3 and 4, Mulford's preparation. The patient was in the hospital at the time and her temperature was taken every two hours for two days. The temperature was irregular, rising about one degree, but fell to normal during her stay in the hospital. The improvement in her condition occurred immediately after the third injection of tuberculin. There was neither local nor general reaction. As to whether the disease was inherited or acquired, he thought that if it had been inherited, the treatment given would have made her worse. The improvement in the case took place in such a short time, from September 28th until five weeks ago. When mercury is given in a case of inherited corneal trouble, the patient usually gets worse and not better. It was on the effect of the treatment in this case that the diagnosis of acquired syphilis was made.

Thrombosis of One of the Retinal Veins Presenting a Typic Picture of the Leber Spot.

Dr. George F. Suker presented a healthy, robust youth of 22 whose family and personal history were negative. While lift-

ing a very heavy weight in a stooping position he noticed after the day was over that his left eye was rapidly losing its vision. Within twenty-four hours practical blindness ensued. Ten days later he consulted Dr. Suker.

Status Præsens: Tension, external appearance, and pupillary reaction normal, media clear, vision—faint light perception. The disc suffused, particularly the lower half, several pin points and flower shaped hemorrhages in the immediate neighborhood also in the lower quadrant towards the temporal side. A band of apparently edematous retina extended from the disc to the macular area. The vessels were of practically normal caliber and outline, excepting that the lower retinal vein coursing towards the temporal region was enlarged but not tortuous and was surrounded by a distinct haze, apparently a serous effusion. Above the macular area there was in every particular a typical and classic Lebor spot, a moderate film of haziness surrounded the entire stellate spot.

Blood pressure normal, no cardiovascular lesion recognizable, frequent and careful urinalysis negative. Potassium iodid in ascending doses was prescribed for three days with no improvement. Deep local circulatory massage of the eye through the lid is now being used three times a day for five minute periods, followed by hot compresses. The potassium iodid was reduced to 20 grains per diem. Improvement followed the second day of massage when fingers could be counted at 4 ft. The vitreous now showed a minute haziness for several days, when it disappeared entirely.

No change in the treatment was instituted and on October 27, vision, with — .50 cyl. ax. 180 = 20 32 — 1.

The entire picture gradually cleared up—no vestige remains of the Lebor spot. The nerve head is practically normal in appearance and the hemorrhages have been absorbed. The other interesting feature is that the patient has a large positive scotoma embracing about three-fourths of the lower field corresponding to the lesion, evidently caused by the Lebor spot. His central vision today with the correction is 20 30, and he still complains of a moderate haze covering objects looked at. His large scotoma does not seem to annoy him greatly. The fact that one cannot detect "any visible" change in the choroid or retina with so large a scotoma as a result of such a grave lesion is indeed worthy of note. Perhaps, changes may become visible later.

Discussion.—Dr. Major Worthington referred to a patient whom he exhibited two years ago, suffering from the same condition. The man was fifty-one years old; had 9/200 vision in the left eye, and 20/20 in the right eye. Dr. Wood and several others who saw the case at the same time pronounced it one of thrombosis of the retinal vein. There was from 8/10 to 1½ per cent of sugar in the urine, no albumin at any time; specific gravity, 1022.

Dr. H. W. Woodruff inquired as to how the eyeball had been massaged, and whether the improvement in the case was attributed to the massage.

Dr. Robert von Der Heydt inquired as to the possibility of using some drug which would dilate the peripheral vessels and thus favor absorption; amyl nitrate or nitrous oxid. This might be possible if the thrombosis was not too well organized. He thought that this would be better than giving potassium iodid internally for its mental effect.

Dr. Suker said that at no time did he find albumin or sugar in the urine. He was convinced that the massage and not the potassium iodid was responsible for the improvement, because he did not start the massage until three or four days after he first saw him, whereas the patient had been taking large doses of potassium iodid for some time, but noticed no improvement. The massage was given three or four times a day for four or five minutes at a time, and immediate improvement was noted. The dose of the iodid was reduced and the massage continued. His vision improved very much. He thought the suggestion of using amyl nitrate or nitrous oxid to open up the peripheral vessels was a good one, but he did not believe it was feasible in his case, because the improvement under the treatment given was continuous, and no other measure was called for. However, he thought it would be an admirable procedure to use in cases where massage did not give relief. Deep local massage directly through the lids administered with the pulp of the fingers or a pneumatic masseur will accomplish practically the same thing, namely, opening the peripheral vessels.

Monocular Retinitis Pigmentosa.

Dr. A. A. Hayden reported the case-history of a man with retinitis pigmentosa in one eye, the picture being typical of the four cases previously described in the literature. The interest-

ing feature was that the man absolutely denied a syphilitic infection at any time.

Discussion.—Dr. Robert von Der Heydt called attention to the fact that another case of this kind was reported by Hans Reuter, in 1908, in the *Archiv. fuer Augenheilkunde*. The patient was sixty-five years old, and had acquired syphilis thirty years before.

Dr. Suker wanted to know whether the irides had been examined with reference to whether the rugæ were present or absent, and whether by oblique examination there was apparent thinness. He asked this to eliminate positively a syphilitic infection. He thought that the man had a Romberg and an absent patellar reflex. He had an Argyll-Robertson pupil, but that, of course, did not mean tabes, although it is positive evidence of the fact that the spinal cord has been involved. This might happen in an early senile dementia, or in a multiple sclerosis. He has noticed in cases of syphilis of old-standing that the pigmentary surfaces of the body elsewhere suffer loss of pigment, and this naturally would include the irides, and that these instead of being folded in appearance, show a peculiar flattening out. By oblique examination there is more or less absence of pigment, and if that is the case one might put down syphilis as the etiologic factor, together with marked arteriosclerosis, which is present in this case.

Dr. Hayden said that the case had not been transilluminated, but that the markings in the iris were normal. The irides were examined by himself and others and no changes were apparent.

Fetal Iridocyclitis With Probable Glioma.

Dr. E. La Mothe reported the case history of a child, six months old, in whose left eye there was a pupillary membrane and seclusion of the pupil. The anterior chamber was very shallow: the tension of the eyeball normal, although two months ago it was minus 1; in the right eye, under slight dilatation, there was nearly total synechiæ, although there was a tumor projecting into the fundus near the ciliary body on the nasal side. The light color of the tumor led him to think it was a glioma.

WILLIS O. NANCE, *Secretary*.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Meeting of November 18, 1911, in Denver. Dr. Wm. C. Bane presiding.

Atrophy of Iris.

Dr. Edward Jackson presented a patient, a woman aged 55, suffering from absolute glaucoma of about three years standing. The glaucoma was primary, the media clear, and no other degeneration of the ocular tissues was present. About half the width of the iris, from the median line above along the nasal one-third of the circumference of the pupil, showed loss of the anterior layer. At the upper part shreds of this layer hung forward in front of the pupil, looking like persistent pupillary membrane. Other parts of the iris were dark brown. The denuded portion was a light yellowish gray, and showed a comparatively uniform fibrillated stroma. The sphincter of the iris seemed completely atrophic. Solutions of eserine did not produce the slightest effect on the pupil. There was pain, but it was desired to avoid enucleation.

Discussion.—Dr. Patterson thought in considering the pathology of the condition that there was the possibility of there having been an iridocyclitis and that the glaucomatous symptoms were a sequence. He suggested chlorid of calcium internally as recommended by Risley. Dr. Walker had had a case of atrophy of the iris unaccompanied by glaucomatous symptoms.

Dr. Sisson suggested the use of subconjunctival injections of a solution of sodium citrate to control pain and reduce tension.

Dr. Sedwick said the case in which he had used sodium citrate injections, and which had been reported to the society, had done well, the eye was quiet and the patient had had no pain or increase of tension for the past six months.

Dr. Jackson said in closing that a large proportion of the cases of atrophy of iris were associated with glaucoma. He would use injections of sodium citrate in this case.

Congenital Dislocation of the Lenses.

Dr. Jackson also showed a boy aged thirteen, under observation five and one-half years, in whom both lenses were dis-

located inward, and the right a very little downward; so that the temporal edge of each lens came behind the edge of the iris. The refraction through the lens was: O. D., .12 sph.; O. S., .18 sph. Alongside the lenses it was about H. 10 D. Vision at first had been brought up by correcting lenses to 4 12 partly. It has now declined to 4 22, and the boy can no longer go on with his school work, and some operation seems necessary.

In a girl of twelve, who had been watched four years, the lenses were dislocated downwards so that their upper margins were visible at the upper edge of a 5.5 mm. pupil. In this case vision had improved to 4 9 partly, with correcting lenses — 12 sph. C — 2 cyl.

In a third case, watched for three years, the lenses were dislocated inwards. The boy was twelve years old when first seen and in one eye vision was already reduced to perception of moving objects. In the other eye vision equalling 0.4 was obtained with a correcting lens, — 16 sph. D. At one time, following a blow on the head, both lenses became dislocated into the anterior chamber; but were restored to position and subsequently retained behind the iris. The above cases were the only known instances of ocular defect in their respective families.

Discussion.—Dr. Spencer asked if in case an iridectomy was performed on the first patient would it be best to make it inward to get the benefit of the lens or outward away from the lens.

Dr. Walker and Coover would needle in this case. Dr. Jackson had considered the various operations but was inclined to extraction.

Extirpation of Both Lacrimal Sacs.

Dr. Chas. E. Walker presented a case in which he had removed both lacrimal sacs. The case was complicated by entropion and trichiasis and a double Hotz had been done with satisfactory results. No dryness or epiphora had followed the extirpation of the sacs so far.

Discussion.—Dr. Sedwick asked for the experience of the members present as to the presence of epiphora and dryness following sac removals.

Dr. Boyd had removed the sac in four cases. In each case epiphora persisted from four to six weeks following the operation, then disappeared.

Dr. Spencer had removed the sac in three cases and had had

no dryness. He had noticed that Mueller of Vienna always removed the accessory lacrimal gland in these cases.

Persistent Chronic Conjunctivitis and Keratitis Following Successful Hotz Operations for Entropion.

Dr. Walker also presented a young man 36 years of age with a chronic conjunctivitis and keratitis in both eyes which had persisted after the entropion had been completely relieved by Hotz operations. There were no granulations of the palpebral conjunctiva, but a congested thickened condition of the bulbar conjunctiva was present. All forms of treatment had been tried.

Dr. Boyd suggested peritomy.

An Unusual Form of Occlusion of the Nasal Duct.

Dr. Wm. C. Bane made the following preliminary report:

R. R., aged 18, applied for treatment of chronic disease of the right lacrimal sac. Epiphora had existed for several years. Mucopurulent secretion of the sac. A No. 5 Bowman probe passed the usual length, but could not be seen in the nose, though marked atrophy of the inferior turbinate existed. Fluid would not pass into the nose. Careful inspection of the nose with the probe in situ and rotated, revealed a movement of the tip of the probe covered with thickened tissue. Cutting away the thickened tissue liberated the tip of the probe and also permitted fluid to pass readily through the duct into the nose. There followed marked improvement, but owing to a chronic condition of the sac and duct the cure is not yet complete.

Salvarsan in Atheroma of the Retinal Vessels.

Dr. J. A. Patterson reported the case of a man 46 years of age who had syphilitic infection twelve years ago, and which he claims was treated for a prolonged period in an eastern city. He came west two months ago in such poor physical condition that his physician has been trying by rest, diet and tonics to get him in condition for the administration of salvarsan. The patient suffers from gastric crises, absent patella reflexes and distinct Romberg symptoms. The pupils are slightly larger than normal, react sluggishly to light stimulus but promptly on convergence. The patient's mind seems sluggish and he looks ill. O. D. V., an occasional letter in 5/20. In taking the field

by Bjerrum's method, a lateral nystagmus was noticed which could not subsequently be elicited by rotation. No central scotoma could be found though he cooperated too poorly to make this certain. The color fields were reversed, but the form field was not contracted. O. S. V., 5/12.

Ophthalmoscopically the right nerve was pale, particularly the temporal edge, and above and below the nerve there was an area of pale reflex as if there had been an exudation. There is an area to the nasal side of the disc giving a peculiar reflex as if the retina was wrinkled, there probably having been an edema at that point. The retinal vessels have thickened coats and where the veins and arteries cross above and in from the disc there is an area of thick exudation.

In the left eye the upper retinal vein just above the disc is occluded by the artery which crosses it. The small macular vessels running horizontally on the disc have markedly thickened coats. July 27 the patient was given a full dose of salvarsan intravenously. The patient was not seen again until Aug. 7, when the improvement in his general condition was very marked, the thickening of the retinal vessels greatly lessened and some areas of thickening previously seen could not be found. O. D. V., 5/12; O. S. V., 5/9. The patient's age is 46 and the salvarsan was given with some hesitancy, fearing that the patient had gone beyond the stage where it would be of any value. The patient has not been seen since the last mentioned date. His family physician tells me he gave him another dose of salvarsan on September 11, at which time gastric crises had ceased and his station was much improved. The first dose was 0.40 and the second dose 0.45 mg.

Discussion.—Dr. Marbourg had seen a case of double choked disk following a dose of "606" given six months previously.

Homonymous Diplopia With Erratic Position of Images.

Dr. Patterson also reported a case in an adult where the right eye converged markedly. There was homonymous diplopia, yet the patient, who was intelligent, stated repeatedly that the diplopia became better (distance between objects became less) as the object of fixation was carried toward the right side. The right eye moved out with a halting jerky movement. Vision, with $+1.25$ cyl. ax. $90^\circ = 6/6$. The left eye had some appearance which suggested choked disc, yet

there was the possibility that this might be due to the presence of opaque nerve fibers. There was some tenderness over the right eye. The trouble came on with a severe pain in the parietal region. Etiologic factors considered were hysteria or syphilis. Although the patient denied the latter, he was put on mercurial inunctions with the result that the diplopia disappeared.

Central Lesion Causing Rapid Ocular Changes.

Dr. Edward Jackson reported the case history of a patient who had been brought into the hospital in delirium and suffering from sudden blindness. The pupils did not react; there was weakness of all the ocular muscles with double ptosis. The nerve heads at this time appeared normal; no choked discs. A lesion in the region of the chiasm was supposed to be present. At present, six weeks from the time of admission, there is paralysis of the right external rectus and complete white atrophy of both nerve heads. The ptosis has pretty much disappeared. The patient improved under mercury for a time, then became worse. Salvarsan was not given.

Meeting of December 16, 1911. Dr. Melville Black, presiding.

Failure of Vision of Obscure Origin—Perhaps Glaucoma Simplex.

Dr. F. R. Spencer presented the following case: Man, aged 76, was first seen November 28th, and gave a history of inability to see distinctly, and of dull frontal headache after near work. He sees four artificial lights where there is only one, and a ring of light passing through all four, but of the same color as the lights, without rainbow tints. Vision began to fail a year ago. He has been wearing a plus 4.50 sph. before each eye for all near work. Distant vision is 15 20 minus with plus 2.00 sph., and near vision J. No. 2 with plus 5.50 sph. each eye. Repeated tests have failed to show increased tension. The pupils and anterior segments are normal. The lenses are sclerosed and hazy, with very fine punctate opacities, chiefly in the anterior capsule, and two narrow spicules in the inferior cortex. The discs are paler than normal, with a slight bending of the vessels over their edges. Several of the retinal vessels are markedly tortuous. In near vision there

is exophoria of 15 degrees and right hyperphoria of 1 degree. The fields of vision, especially the left, show very marked concentric contraction. Knee jerks normal. Urine negative. Blood pressure, 150 mm. As regards diagnosis, Dr. Spencer suggested glaucoma simplex or optic atrophy.

Discussion.—Dr. Jackson remarked that only the fields suggested glaucoma. If marked contraction were found on repeated tests, especially with a tendency to contract, this suspicion would be strengthened. It did not look like simple optic atrophy. Probably there was some other explanation of the fields than simple glaucoma.

Dr. Neepser said that the caliber of the vessels appeared considerably diminished. Probably the disturbance was primarily circulatory.

Dr. Black remarked that the absence of colored rings, and the presence merely of a blurred halo, were important. He had noticed some floating opacities in the right vitreous. The lenticular process he regarded as part of the general one. It appearing that the fields had been taken with a 3 mm. object, Dr. Black suggested that if the fields were taken with a 1 cm. object, they would be found larger.

Scleral Trephining in Chronic Glaucoma.

Dr. D. H. Coover presented a case of chronic glaucoma which had been under his observation for two years. A posterior sclerectomy done fifteen months previously had given relief from pain until two months back. Tension was at this time $+3$ or $+4$, the eye being stone hard. The sclera was trephined by Dr. Jackson in the Denver County Hospital. Beginning twenty-four hours after the operation, pain had become much less, and for some time she had had no pain whatever. It was now about five weeks since the last operation. Tension was minus. There was a little fresh blood in the anterior chamber. The patient had been subject to attacks of hemorrhagic glaucoma, and for this reason iridectomy was not attempted. Dr. Coover showed Dr. Jackson's trephine, consisting of a simple tube of 1 mm. caliber, sharpened at one end. In using, the tube was revolved between the thumb and forefinger.

Dr. Jackson: The eye was very hyperemic at time of operation. Cocain was injected under the conjunctiva as well

as instilled. When the trephine went through the sclera there was a gush of partly fluid vitreous from the upper end of the tube. Hemorrhage into the anterior chamber which occurred at operation did not anywhere reach to the edge of the cornea, evidently because of a close approximation of the outer rim of the iris to the cornea. The trephine probably went through the edge of the iris as well as the sclera. Dr. Jackson referred to another case of anomalous glaucoma in which he had trephined five weeks previously. The eye had been quite soft for several weeks after the operation, but yesterday tension had risen to about normal, although the eye was free from hyperemia. The filtrating scar looked like myxedematous tissue. He had made no attempt to suture the conjunctival flap in either case. The bevel on the tube prevented it going very deeply.

Discussion.—Dr. Black suggested keeping a finger over the end of the trephine to avoid the gush on going through the sclera.

Probable Wood Alcohol Amblyopia.

Dr. Strickler presented a man 50 years of age, who had come for consultation four weeks previously, completely blind in the right eye. He was a barber. He had mixed a drink of supposed grain alcohol in his shop at 5 p. m., and during that night awakened with a good deal of gastric distress which had continued next day. The second day afterwards he noticed a clouding of vision. Two days later he was completely blind in the right eye and the vision of the left was considerably disturbed. On coming for examination, ten days after taking the alcohol, the vision of the left eye was 2/5. Scarcely any fundus change had been found in the right eye, perhaps a little blurring of the disc. A week later he began to see a little with the right eye and yesterday the vision was 20/200, while the vision of the left eye was normal. There was now a slight paling of the disc. It was undoubtedly a case of retrobulbar neuritis of toxic origin. The alcohol had not the odor of wood alcohol, was bought for grain alcohol, but had been mixed in a perfume bottle before using. The patient denies having been at all intoxicated at the time. He is a moderate drinker and smoker. The treatment consisted at first of iodid and the high frequency current, and later strychnin.

Discussion.—Dr. Jackson said the case was suggestive of wood alcohol poisoning.

Cyst of Iris—Operation.

Dr. Jackson again brought before the Society a patient who had been previously presented on account of a cyst of the left iris. The cyst had gradually increased in size until it measured 6.5 mm. in the vertical diameter and 7 mm. in the horizontal diameter. It had then become somewhat annoying, just covering the pupil in bright sunlight, obstructing vision, and causing slight burning, especially when out in the sun. The cyst being dependent from the outer edge of the iris near the corneal limbus, a 3 mm. incision was made through the limbus, the lance knife passing directly into the cyst without entering the anterior chamber. On withdrawal of the knife the cyst wall bulged through the incision. As much of the wall as possible was torn away with forceps, it being necessary to leave that part of the wall which was firmly adherent to the iris. There had been some pain from pulling on the iris, but the reaction was slight, and the dressing was omitted on the second day. Three weeks later the remains of the cyst were shriveled and appeared to be continuous with the iris tissue.

Dislocation of Lens.

Dr. Jackson presented a case of dislocation of the lens, probably due to trauma. The patient, a man of 46 years, had noticed failing vision in the right eye. He was first seen in January, 1911, and was then unable to remember receiving any injury. His memory had served no better a few days before the meeting, and again just before presentation to the Society, but while sitting in the dark room this evening he had remembered an accident of twenty-three years earlier, in which he had been thrown out of the saddle, his leg and nose broken, and sutures taken in a large cut on his face. The temporal edge of the right iris was quite tremulous, and the anterior chamber here deeper than on the nasal side. The pupil was occupied by a gray opacity, through which a faint red reflex was obtained. Under cocain, vision was $\frac{4}{60}$, and 1 mm. of peripheral cortex was seen to be almost clear. The temporal edge of the lens showed at the margin of the 8 mm. pupil. Slightly back from the iris, in a crescent, clear vitreous was visible.

Dr. Jackson reported the history of a child now aged five years, with double dislocation of the lens. She was first seen

at the age of 32 months. She had whooping cough very badly before a year old, and after that she was noticed to have defective sight. At the age of 32 months she had been able to recognize a 1 in. test lens at 6 feet, and the 3.5 meter figure of Ewing's test card held close to her eye. The irides were quite tremulous, bulging below, and the anterior chamber deep above. The lenses were dislocated downward and inwards and were quite movable; their upper margins were within the pupils. There was some clouding of the peripheral cortex, but fair reflex. In June, 1910, pilocarpin was prescribed for regular use. In November, 1911, the pupils were eccentric, being displaced up and out; the width of the iris up and out was 2 mm., down 3 mm., and in 5 mm.; and the part of the pupil towards the narrow aspect of the iris was in each case clear. After dilating the pupils with homatropin, the vitreous was seen to be clear and the fundus normal in each eye. After skiascopy correcting lenses O. D. + 11 sph. \overline{c} + 1 cy. ax. 125° , O. S. \div 11.5 sph. \overline{c} + 1.5 cy. ax. 70° , were prescribed. There was an evident gain in vision with these.

With regard to the case of dislocated lens reported at the last meeting of the Society, Dr. Jackson stated that the vision had improved and the iris become steadier under pilocarpin.

Dr. Melville Black had recently had a patient 22 years of age whose eye had been struck by a nail, the result being perforation of the cornea, dislocation of the lens, and later traumatic cataract. The eye healed without much discomfort. For the last five years there had been no perception of light in this eye. Two months ago the patient began to have pain in the eye, and there had been repeated attacks of pain since, with glaucomatous tension. Seen on December 12th, the eye was much inflamed, and the dislocated lens lay in the anterior chamber. With the patient in the recumbent position for a few minutes the lens passed out of sight, when the cornea was seen to be more or less vascular and disturbed in its posterior layers. The patient wanted the lens removed for cosmetic reasons, but considerable difficulty was experienced in consequence of the repeated disappearance of the lens when the patient lay on his back or indeed beyond the vertical position. Operation was finally performed with the eye under eserine, the patient leaning forward, and the lid held up with Smith's tenotomy hook. A small corneal section was made below and

the lens taken out with Desmarres' scoop. There had been no pain since the operation and the tension was now normal.

Discussion.—Dr. Black considered that such traumatically dislocated lenses should be removed because of the risk of their acting as foreign bodies in the eye.

Dr. Jackson would propose to remove the lens from his patient's eye if it became opaque, or changed its position and gave trouble.

Monocular Trachoma.

Dr. Melville Black reported a case of monocular trachoma. This was his third case in the last five years. Such cases are stubborn, giving very poor results with operative procedures. After unsuccessful employment of various common modes of treatment, he used Coover's sandpaper method, followed by daily applications of iodid of silver. In a few days' time the lids looked almost as bad as ever, although the swelling was more mushy. He then tried a 5 per cent solution of ichthyol. Since then there has been a steady improvement, with some evidence of beginning cicatrization.

Discussion.—Drs. Hess, Stilwill, and Jackson referred to monocular cases which had come under their observation.

Dr. Libby had encountered a good number of cases of so-called papillary trachoma. In one of them operation had been advised by another physician two years ago, but although the treatment had been limited to the wearing of correcting lenses, the eye was now very comfortable.

Dr. Coover: These are not cases of true trachoma. The granulations are located in the fornix, and can be seen on well everting the lid. There is very little secretion, but a good deal of lachrymation, and some itching. The granulations are found chiefly at the inner and outer canthus. He treats them with sandpaper.

Loss of Vision After Shot Wound of Orbit.

Dr. A. L. Davis of Durango reported the case history of a woman who was wounded by a .22 bullet fired from a shooting gallery. The ball went in a half inch or so below the external canthus, passed through the lower part of the orbit and the nose, and came out under the other eye. The case was seen within twenty-four hours after the injury, when the vitreous chamber was full of blood and tension was minus. After the

use of iodids the blood was absorbed, and a fairly good view of the fundus was had, but vision was gone.

Dr. Coover, who later saw the patient, stated that the eyeball had apparently been penetrated below. The nerve was atrophic. The loss of vision might be due to hemorrhage into the orbit.

Discussion.—Dr. Black suggested that a fracture of the orbit had interfered with the integrity of the optic nerve.

Dr. Strickler referred to a case in which immediate loss of vision and subsequent complete optic atrophy had followed a blow on the eye by an iron implement.

Change of Refraction in Diabetes.

Dr. A. L. Davis reported the case history of a diabetic man of 50 years, whose vision had previously been normal, but who recently became unable to see clearly even at a distance. He accepted for distance $+ 2.00$ D. sph. with $+ 0.50$ cyl. The fundus was practically normal. A correction for distance and near was worn a month; after which time the patient stated that he no longer needed glasses for distance.

Discussion.—Dr. Jackson had seen one case of diabetes in which a change amounting to 2 D. of hyperopia occurred in a few days. Ordinarily a sudden change is in the other direction.

Dr. Ringle had seen two such cases. In one a hyperopic astigmatism had changed to myopic astigmatism at the opposite axis; the second case also became more myopic. Both lost their power of accommodation, but later, after treatment for the general condition, were again able to read without their glasses.

Dr. Neeper suggested as explaining such cases a selective toxemia, possibly revealing a latent hyperopia.

Refraction and Menstruation.

Dr. A. L. Davis reported the case history of a woman who complained of pain at each menstrual period, was given a refractive correction of cylinders against the rule, and afterwards reported that menstruation had become much more regular and comfortable.

Discussion.—Dr. Coover mentioned a case in which a six or eight weeks pregnant woman had aborted upon the use of a mydriatic for refraction.

Salvarsan in Parenchymatous Keratitis.

Dr. Melville Black reported the intravenous administration of salvarsan in an aggravated case of interstitial keratitis in a youth, a tuberculin test having proved negative. It was the second eye to be involved, the first one was getting better at the time, the boy had been under mercury at the time the disturbance in the first eye began, and heavy doses of sodium salicylate had also been used. The result of the salvarsan was apparently nil.

Discussion.—Dr. Neepor in such cases favors intramuscular injection of the drug because of the resulting slow absorption, and with this method has seen some cases that did nicely. He has also seen a case that appeared to do well on cacodylate of sodium, a negative Wassermann being also obtained.

Dr. Jackson referred to two cases which were being treated with salvarsan in the Denver College clinic, and in which there seemed to be improvement as regards the pain and photophobia.

Posterior Polar Cataract.

Dr. Stilwill presented a man of 38 years with bilateral posterior polar cataract. The vision with either eye was fingers at 2 feet. He had always had poor vision, and especially at night; but it had been getting steadily worse during the past ten years. One brother had had similar trouble. The retinal vessels were small, and there were some old spots of choroiditis, opacities in the vitreous, and some small pigment spots at the periphery of the retina.

Discussion.—Dr. Black thought that the lens changes were congenital.

Dr. Libby thought that the pigmentation at the retinal periphery had the bone corpuscle shape.

Meeting of January 20, 1912. Dr. J. A. Patterson, presiding.

Magnet Extraction.

Dr. A. C. Magruder presented a man whose right eye had been penetrated by a piece of steel on December 4, 1911. When seen two hours after the injury, the wound in the cornea was closed, but there was a gaping wound in the iris 1 mm. from the temporal margin. There were vitreous opacities, but the

lens was clear and the fundus was readily seen. The pupil was dilated with solutions of cocain, homatropin, and atropin, used in the order named and five minutes apart. With Dr. Patterson's assistance an unsuccessful attempt was made at magnet extraction. An X-ray examination showed the foreign body to be 0.38 inch back of the eyelid. After this, and on the afternoon of the day of the injury, extraction was done with the magnet, the foreign body following the route of entrance except that it had to be coaxed over the edge of the iris through the pupil. A very careful examination had failed to discover the foreign body in the eye before removal. In twenty-four hours a stellar cataract consisting of eleven distinct spokes had formed. The high frequency current was used. The spokes now coalesced at the point of entrance of the foreign body, but five could still be counted. Vision without a glass was now + 2.00, and with the pupil dilated and + 2.00 D. sph. lens, 20 20.

Discussion.—In reply to a question by Dr. Strickler, Dr. Magruder stated that the reason for the combined use of the three mydriatics was that it was desired to obtain prompt dilatation by means of the action of cocain on the radiating muscular fibers, and of the homatropin on the sphincter fibers, and lasting dilatation from the atropin.

Dr. Freidmann: The most interesting feature of the case was the arrest of development of the incipient cataract. Was the interference with the nutrition of the lens counteracted by the high frequency current?

Dr. Walker: After so successful an operation, he was surprised at the patient's statement that he couldn't see.

Dr. Black: This lens would all become clear in time. He referred to a case the history of which he had reported some years back, in which a piece of copper remained in the lens, which did not begin to become opaque for three months.

Dr. Neeper: The chance of preserving these lenses depends on immediate mydriasis, while the capsule wound remains open. This prevents admittance of the aqueous by movements of the ciliary muscle and lens.

Dr. Patterson thought it likely that the foreign body had to make a complete revolution before passing the iris.

Drs. Strickler and Neeper commented on possible refractive changes in the lens apart from the formation of the cataract.

Magnet Extraction.

Dr. E. R. Neeper reported the case-history of a man of 45 years whose right eye had been penetrated by a piece of iron from a water pipe which was being chiselled. The fragment measured 5 mm. by 5 mm. by 1.5 mm., and entered at the nasal limbus. When the patient was seen, an hour after the accident, the anterior chamber was full of blood, and fresh hemorrhage occurred daily for about three weeks. Magnet extraction through the wound of entrance was done with the help of Dr. Patterson about two hours after the injury occurred. There had been a good deal of pain in the eye, but never much ciliary injection. There was an iridodialysis involving the lower two-fifths of the iris, and anterior synechia at the site of the wound. The eye could perceive hand movements, and had become practically quiet. The wound of entrance had to be slightly enlarged to permit of the exit of the fragment, which had to be tilted with a pair of forceps before finally escaping from the eye under traction of the magnet.

Discussion.—Dr. Bane remarked that the eye would probably be lost on account of the injury to the ciliary region; and that the other eye would have to be carefully watched for indications of sympathetic disturbance.

Question of Operation on Soft Blind Eye.

Dr. Neeper asked for the opinion of the members as to the prospects from operation on a case of softened eyeballs with occlusion of the pupils and no light perception; he having advised against operation, for which the patient was anxious.

All the members present were agreed that no operation could restore sight in this case.

Protruding Optic Discs With High Hyperopia. Cholesterin Crystals on Discs.

Dr. Neeper presented a woman whose optic discs were elevated 2 D. above the general fundus level. She was hyperopic about 6.50 or 7 D., with 1.50 D. of hyperopic astigmatism. The disk margins were hidden, but no hemorrhages, exudates, or evident changes in the caliber of the vessels could be made out. On the disc and on the retina in its vicinity were numerous cholesterin crystals. The patient complained of a great deal of frontal and occipital headache. The vision was

not greatly below normal. The fields were negative. Wassermann reaction was negative. The patient was apparently free from any nasal disturbance. The eye condition had not changed materially for several years.

Discussion.—Dr. Black: The optic disc is liable to be raised above the level of the surrounding fundus in cases of high hyperopia. The case first appealed to him as one of choked disc, but this was rendered improbable by the long history of the case.

Dr. Coover had thought of a neuroretinitis, but did not believe the case was of that nature.

Dr. Libby would like a thorough study made of the kidneys and blood pressure.

Dr. Hosmer thought there was nothing pathologic about the case, which he was disposed to call a pseudoneuritis.

Dr. Patterson thought an inflammatory condition had existed at some time.

Conjunctivitis With Facial Dermatitis.

Dr. Neeper presented a case of conjunctivitis associated with a dermatitis of the face, which had been treated by the patient, a drug clerk, with a variety of applications, and had finally yielded to sulphate of zinc. There was no mucoid secretion such as would be associated with a diplobacillary infection.

Discussion.—Dr. Black recommended the combination of boric acid with sulphate of zinc to reduce its irritating effect.

Dr. Libby referred to a case of conjunctivitis that had been treated with protargol and argyrol without success, showed only staphylococci in the secretion, and got well and stayed well after treatment with saturated solution of boric acid.

Dr. Bane suggested calamine lotion for the dermatitis.

Dr. Patterson recommended acetate of zinc and boric acid.

Thrombosis of Central Retinal Vein.

Dr. Hosmer and Dr. Patterson presented a man of 60 years, first seen by the former on September 30th, 1911, with a typical thrombosis of the central retinal vein in the left eye. The blood pressure was 226 mm. The fundus had been dotted with areas of hemorrhagic retinitis, in a relatively large one of which the macula was involved. On October 21st, with the affected eye, the patient distinguished the upper parts of fin-

gers at two feet. In the right eye the same patient presented a peculiar crescent, apparently of connective tissue, lying across the upper edge of the disc and obscuring the retinal vessels at that place. It had not the appearance of opaque nerve fibers.

Gummi of Brain After Salvarsan.

Dr. E. M. Marbourg presented, on account of the disturbance of the optic nerve involved, a man who eight months earlier had had a dose of salvarsan, and then after six months had developed a gummi of the brain, which had yielded to antisyphilitic treatment. There had been marked choked discs and retinal hemorrhages, but the eyes had returned to normal.

Embolus of Central Retinal Artery.

Dr. E. M. Marbourg presented a man aged 30 who had become suddenly blind in the left eye while stooping over to tie his shoe. When he was first seen, one week after the accident, the vision of the eye was nil. In the macula was seen a cherry red spot through a general retinal edema. No syphilitic history was obtainable, urinary analysis was negative, and the blood pressure was 165 mm. Vision had improved to 20/200 +.

Discussion.—Dr. Black called attention to the possibility of determining by pressure on the eyeball the amount of circulation in the retina. Where the circulation was very feeble it was easy to completely blanch the vessels; this became harder as the circulation was reestablished. The effect of pressure in emptying and refilling the vessels might explain the benefits obtained from massage in such cases.

Dr. Hosmer referred to a case of venous thrombosis in which he had made pressure on the eyeball as recommended by Dr. Black, and the vision had become much worse for three days; but the final result of the case was phenomenally good, vision of 5/6 being reached.

Cerebral Tumor.

Dr. E. M. Marbourg presented a girl of five years, with choked discs, retinal hemorrhages, and patches of retinal degeneration. She suffered from paroxysmal headaches, complained of pain back of the neck, and had projectile vomiting.

The patellar reflexes were nearly abolished, the child was unable to stand alone, and there was a tremor in the arms. The pupils reacted sluggishly and were dilated. The father acknowledged having had syphilis, and also stated that the child had fallen from a bicycle three months previously.

Discussion.—Dr. Friedmann favored the idea that meningitis in some form was present.

Dr. Hosmer had noticed the presence of otitis media, which suggested that the condition might arise from the middle ear.

Dr. Black commented on the extensive edema of the retina and the widespread degenerative changes, and thought the diagnosis lay between tubercular meningitis and glaucoma.

Tuberculous Keratitis.

Dr. Magruder presented a girl of seven years, who had a history of suffering from sore eyes for five years. After various other lines of treatment the eyes had cleared up rapidly under mercurial inunctions. In December, 1911, Dr. Patterson had seen her on account of acute adenitis, with a high temperature; and shortly after this attack the corneas got very bad again. A second improvement took place under mercury, but was followed by another relapse. A Wassermann test had been negative, but a Moro tuberculin test had twice proved positive. Tuberculin had not yet been given therapeutically.

Dr. Coover had had two cases of tuberculous keratitis and one of tuberculous cyclitis. The former had been on tuberculin since July, 1911, and were almost well. He had a dose, at first a very small one, of old tuberculin, given every fifth day, and had the temperature taken three times daily for the first day or so after giving each dose, and gradually increased the dosage. He was in favor of trying tuberculin in cases of interstitial keratitis that were negative to the Wassermann test.

Coloboma of the Iris.

Dr. Patterson presented a young woman who had bilateral coloboma of the iris. She had consulted him on account of photophobia and headache. Corrected vision of the right eye was 5/7 and of the left 5/7 part. The colobomata were almost symmetrical in every respect. Both extended directly downward from the pupils, their pillars blending gradually with

the pupils above, and converging below toward the corneal limbus. The right one just escaped involving the whole width of the lower part of the iris, the left one apparently reached to the ciliary body.

Retinal Hemorrhage.

Dr. Patterson presented a woman 35 years of age who had consulted him on November 4 on account of failure of vision in the left eye. The vision of the right eye was then $\frac{5}{4}$ and of the left $\frac{5}{40}$. The lower temporal area of the left retina showed a number of irregularly placed blood clots, reaching to the edge of the left macula and apparently arising from the lower temporal vein. The urine was negative. She gave a history of having to strain habitually at stool. She had been married seven years, and had had two miscarriages, one attributed to a fall downstairs. She had been treated with iodid of mercury, potassium iodid and high frequency current. By December 18th almost all the blood was absorbed. On December 26th Wassermann was negative. Corrected vision of the eye on that date was $\frac{5}{5}$ part.

Discussion.—Dr. Black referred to a young man whom he had seen first five years previously with a retinal hemorrhage, and who had recently had a subhyaloid hemorrhage obscuring the entire disc. His heart was sound, and blood pressure only 127 mm., but on deep pressure the radial artery indicated arteriosclerosis. Pressure on the good eye failed to exsanguinate the retinal vessels.

Dr. Nepper referred to a case which he had seen that evening, in which the vessels presented the appearance of a broken column of mercury in a thermometer. Vibratory massage had seemed to make the column of blood more continuous.

ELLET O. SISSON, *Secretary.*

OPHTHALMIC SECTION
ST. LOUIS MEDICAL SOCIETY.

Meeting of November 1, 1911. Dr. H. M. Post presiding.

Intraocular Exudate.

Dr. F. E. Woodruff presented a patient with the following history: Child, five years of age, came to Washington University Eye Clinic about two weeks ago. A nurse who had been called in to attend another member of the family had observed a white reflex in the patient's left eye and called the parents' attention to it. Family history good. No history of any serious illness, except an attack of typhoid two months ago, which was followed by an uneventful recovery, and no complications, unless this eye condition be one.

The eye, as you see it, does not need describing. One thing that deserves notice is the pupillary reaction in the right eye when the left eye is illuminated.

I noticed on the first day some retinal reflex at the upper and nasal side as well as the temporal side. There is none on the nasal side now, nor did I see any after the first day. The other eye appears normal in every respect, and has normal vision.

Discussion.—Dr. Barck: I think the exact diagnosis in this case can hardly be made now, but possibly can at a future time. The picture is certainly not one of glioma such as we usually see. Excluding glioma, the diagnosis lies between metastatic infection of the vitreous, commonly called metastatic choroiditis, and an entozoon. Of course we ought to know more about the typhoid fever which the patient is supposed to have had. So far we have only the statement of the father. Typhoid, like other infectious diseases, may cause metastatic affection of the vitreous, but it is more or less of a purulent character, accompanied by inflammatory symptoms. Such have been wanting in this case, as far as the history goes. Furthermore, in metastasis from infectious diseases, the color of the infiltrate in the vitreous is yellowish, whilst here

the color appears to me to be whitish-gray without any yellow tint.

Dr. Post: In a case of retinal detachment we would probably find some of the retina normal, whereas in this case we can see no normal retina.

Dr. Ewing: I remember opening several pathologic specimens in the University at Kiel in which the vitreous had this appearance in places. It was called an albuminoid exudate into the vitreous. I have since had such specimens following injury which had been fixed in formaldehyde. It looks to me like a general albuminoid exudate into the vitreous which had not become purulent. It is a condition which I have never observed in the living subject. Until a more satisfactory explanation can be found, I am inclined to rest on the theory of an albuminoid exudate that either came on suddenly or was so formed that it created no inflammatory disturbance, not even sufficient to redden the conjunctiva.

The other three conditions possible, are tuberculosis, glioma and entozoa. It has not the appearance of a glioma.

Dr. Barck: We do not know how long this condition has existed. It was discovered accidentally and the connection with the possible typhoid is mere supposition. But one thing is certain, and that is the presence of cholesterin in the vitreous. The glittering crystals of this substance cannot be mistaken. Furthermore, I believe the round and oval-shaped gray bodies, which we see floating around in the vitreous during movement of the eyeball, to be colloid bodies, without making any more positive statement as to their origin. There seems to be no increased intraocular tension at present, which speaks against the probability of a tumor.

I do not recollect having seen such a picture of the vitreous before with the ophthalmoscope, but I have some specimens where the appearance of the vitreous is quite similar. They are cases of infection of the vitreous after perforating injuries. In them the entire vitreous is transformed into floating masses of whitish-gray color. There is scarcely any yellowish tint such as we find in suppurative processes, but as these specimens have been laying for some time in formal solution, I am unable to say how much this may have to do with the color.

Dr. Post: The condition seems to me to be associated with the fever. There was probably a low-grade suppurative choroid-

itis in the eye accompanied by an exudation into the vitreous. This exudate gravitated into the lower portion of the vitreous chamber, producing the condition we have here. In looking into the eye, a level surface can be seen stretching back a considerable distance from the front of the vitreous body, and this level surface moves up and down as the eye is moved about. There seems to be a number of small globular bodies resting on this level surface corresponding to those which we see in the vitreous above.

It does not impress me as a case of tumor, but as one of those suppurative processes occurring in various parts of the body following low fevers. I am inclined to think this is the condition and that we may possibly find that it will clear up in the course of time.

Concussion Cataract With Recovery.

Dr. J. W. Charles stated that on January 15, 1910, a boy, eight years of age, was brought to him with the statement that while coasting his forehead was struck by a sapling lying horizontally. The eye became red and the mother consulted her physician, who used drops to dilate his pupils. Without correction, his vision was O. D. 10/120, O. S. 10/120, also with stenopeic disc. With each eye the ophthalmometer gave 0.75 ax. vertical; pupils were large and responded only slightly to light. Oblique illumination and the ophthalmoscope showed both lenses clouded by not only a few striations but with a very distinct diffuse opacity resembling zonular cataract. Fundi normal as far as could be seen. His conjunctivitis was treated for several days and on the 18th the vision of the right eye was 19/120, of the left 19/120, not improved.

The patient was taken south by his mother and I heard nothing further from him until word reached me that I was severely criticized for having made a mistake in diagnosis because he did not have cataract and that the eyes were normal. Dr. Ewing has kindly allowed me the use of his notes for the completion of this history. In May, five months after the injury, vision of the right eye was 20/15, of the left 20/15. The media and fundi were normal.

Although the child's vision was so low and the lens opacities were demonstrable to the mother, the fact that I spoke of the possibility of an operation in the distant future if the

lenses did not clear up has caused the mother to believe that I made an unpardonable mistake.

Certainly, if a child were brought to the ophthalmologist with such a condition, he would feel inclined to tell the parent not to expect much chance for the better because the great majority of these cases are congenital and do not retrogress.

Many cases of reabsorption of traumatic cataracts have been reported and one would expect to make a guarded prognosis in the event of a blow on the eye, but when only the head had been struck without a history or manifest signs of injury to the eye, it was natural to think of the condition as congenital. Even lenses with commencing senile cataract have been found clear several years after. This opacity was not the ring-form opacity of the anterior surface described by Vossius in 1906, as resulting from contusions of the globe, but it more nearly resembled the ordinary faint forms of zonular cataract.

In the last number of the *American Journal of Ophthalmology*, Dr. Shoemaker reports from the *Journal of the A. M. A.* the views of Clapp concerning the autolysis of the lens fibres in the absorption of broken and opaque cells, and concludes that the lens of the youth is more "easily liquefied and absorbed because there is less of the insoluble albuminoid present and the enzymes are all active. In the aged, on the contrary, there is a much larger amount of the insoluble portion and all of the enzymes are relatively weak." While he is evidently speaking of actual rupture of the capsule and entrance of the aqueous, one can readily suppose a somewhat similar process in a case of mild contusion where fibres may be supposed to be bruised and temporarily opaque.

Discussion.—Dr. Ewing: The patient Dr. Charles has referred to consulted me in May of last year with the story that the boy had cataract. I examined very carefully every portion of each lens and was doubly cautious because of the mother's being so positive in her statement. There were no pathologic changes in either lens. The vision in each eye was normal. I told the mother that she must have misunderstood Dr. Charles; he had probably said that cataract might develop from such an injury. Until Dr. Charles spoke to me recently about the case, I was not aware that lens changes had actually existed.

Dr. Barck: I have seen, as everybody has, cases of traumatic

cataract where the rent in the capsule was very small and closed again; the cataractous area did not progress but cleared up by and by. Such cases are not very rare, but I have never seen a case of congenital cataract which cleared up spontaneously.

I should like to add a brief remark in reference to Dr. Woodruff's case. These metastatic affections after typhoid fever or any other general infectious disease, are usually termed "metastatic choroiditis." The choroid in such cases is not primarily affected; it may be the ciliary body, but I believe that the metastasis takes place primarily in the vitreous. In it most of the pathologic changes are found. I possess one interesting specimen in this respect; a suppurative process in the vitreous secondary to purulent cerebrospinal meningitis, in which the choroid does not show any changes, and the ciliary body is hyperemic only. I believe that in cases of intraocular metastases after general infectious diseases, we have to deal with a direct infection of the vitreous.

Dr. Post: Dr. Charles' case is certainly very interesting. It would seem possible that if the nutrition of the lenses were interfered with by the violence of a blow, there might be sufficient changes in the lenses to be apparent, but as the effects of the blow were recovered from, the nutrition might be re-established and the lenses thus regain their transparency. It may be something we have never seen, and we may see something tomorrow we have never seen before. This case ought to make us careful in our prognosis when we meet with a traumatic cataract where there is no other evidence of trauma in the lens except the loss of transparency. As has been said, there are a good many cases reported where portions of the lens have become opaque and have later cleared up, and this case differs from these only in that the changes were more extensive. I think there is nothing improbable in this case.

Meeting of December 6, 1911.

The Antiseptic and Germicidal Properties of the Silver Salts and Preparations.

Dr. Marsh Pitzman read a paper concerning the antiseptic and germicidal properties of the silver salts and preparations, and his conclusions were as follows: That silver nitrate com-

bines with albumins in a definite ratio of quantities; in simple words, enters into a true chemical reaction.

We therefore have two possible silver nitrate-albumin mixtures. First, those in which silver nitrate is present in less amount than is required to satisfy the albumin affinities. Second, those in which silver nitrate is present in excess of the amount required to satisfy the albumin affinity. The first class, without excess free silver nitrate, are very poor germicides, killing staphylococci only at the end of twelve hours, but are antiseptics. The second class, with excess free silver nitrate, are powerful germicides. In the list of the silver albuminates at present in use we have both classes represented. Argyrol and collargol are silver albuminates without excess free silver nitrate, hence are antiseptics but poor germicides. Albargin, ichthargan, novargan, etc., and most of the newer preparations, are silver albuminates plus excess free silver nitrate, hence are good germicides. As the second group contains excess free silver nitrate it does not appear reasonable that its members can have any real advantage over the simple dilution of the nitrate of silver.

Discussion.—Dr. Alt: I am very glad to have heard this interesting paper because I have for a good many years been in the habit of using protargol when I had to deal with purulent conjunctivitis and using argyrol in catarrhal cases, because I found that protargol acted quicker than argyrol in the former ones. This is, as Dr. Pitzman has explained, probably due to the excess of nitrate of silver in protargol.

Dr. Charles: I should like to ask Dr. Pitzman one question, that is, why the silver albuminate does not continue to retard the growth if it retards it at once?

Dr. Post: I would like to ask Dr. Pitzman if he regards argyrol as inaccurate as a germicide due to inaccuracy in the amount of excess of free nitrate of silver in the preparation?

Dr. F. L. Henderson: The old question of the relative merits of argyrol and protargol comes up again. I know Dr. Alt's views on the subject; he has always advocated the use of protargol in purulent conditions in preference to argyrol. I think there are a number of us who find argyrol equally as beneficial in purulent conditions as protargol. I want to say that since the introduction of argyrol I have not used protargol at all.

In ophthalmia neonatorum, for instance, I substituted argyrol years ago and have used it exclusively. Protargol is often very irritating and painful, and argyrol quite otherwise. The action of argyrol in purulent conditions I think we were given to understand some little time ago in a paper by Schneider, was necessarily germicidal, but was probably due to the production of leukins. When the position is taken that argyrol is of no value in purulent conditions, I think we cannot quite accept it, because I have found clinically that argyrol is equally as beneficial as protargol.

Dr. Alex Wolf: I am very grateful to the Ophthalmic Section for having extended to me the invitation to attend to-night's meeting. The field to which the ophthalmologist devotes his particular attention is somewhat remote from the one which is the object of study and observation of the venerologist, but both have frequently one enemy in common, the gonococcus, and knowing the difficulties they often encounter in combating it, they, better than anybody else, are apt to pass their expert judgment as to the relative gonocidal value of different silver salts.

I agree perfectly with the results of Dr. Pitzman's laboratory researches as far as collargol and argyrol are concerned. Neither has proved in my experience to possess the least bactericidal effect upon the gonococcus living on the human urethral mucosa. I used the collargol injections to the maximum extent of its solubility (5%) three to four times a day for many days, without any marked decrease in the number of gonococci in the urethral discharge. Argyrol even in the strength of 50 per cent had no gonocidal effect, and I have discarded it in my gonorrheal practice entirely. Both preparations have no irritating effect upon the acutely inflamed urethra, but after the lucid explanation of Dr. Pitzman, we can attribute the lack of irritating effect and failure to act as a bactericide upon the gonococcus to the same cause, lack of free silver nitrate. While speaking of collargol, I wish to mention its most wonderful effect, even in the strength of 2 per cent injections, in cases of bact. coli cystitis where it acts very effectively and transforms the foul ammoniacal urine into one of neutral or normal reaction. In one regard more the result of the laboratory researches carried out by Dr. Pitzman tallies with my experience, the outspoken gono-

cidal effect of nitrate of silver even in very fine dilution. As long as fifteen years ago my teacher and master, Ludwig Spitzer, of Lang's Syphilis clinic in Vienna, instructed the staff physicians to add 0.1 ccm. Ag. NO_3 to each liter of 1.3000 permanganate of potassium solution, in applying Janet's method of the treatment of urethral gonorrhea, and to compare the results obtained with the original Janet's application (without nitrate of silver). The investigation proved decidedly in favor of the mixed application, through which the course of the disease was invariably shortened.

In regard to organic silver salts as gonocides, my experience of about fifteen years of practical work, having passed through the whole gamut of the organic salt preparations in the succession in which the chemical industry placed them on the market, is similar to one Goethe's Faust expresses in his famous monologue: "I am just as wise as I was before . . . " From protargol through ichthargan, argentamin, albargin, syrgol, down to the latest addition, the silver iodid emulsion of Parke-Davis and Company, I fought myself through with zeal, energy and much optimism, to find only that just in a case in which I was particularly interested, in which a failure was going to hurt considerably, my favorite preparation proved a dead-sure disappointment. I recollect an instance in my recent experience, where albargin, which of all silver preparations gave me most satisfaction in the treatment of gonorrhea, had not produced any effect upon gonococci despite a prolonged (three weeks') treatment, while Parke-Davis and Company's preparation of silver iodid, which I had applied previously in several cases without any encouraging effect, brought about the total disappearance of gonococci within six days (twelve treatments). I shall pursue the matter in order to ascertain whether or not the application of different silver salts in the course of treatment will be advisable, lest the effect of the first applied preparation wear out.

Closing, I wish to emphasize the old established fact that the results of laboratory research work cannot apply in full measure to practice. The human body in itself is the most complicated laboratory. Most powerful and only in a small degree known biologic factors influence the effect of every drug introduced into the human body for curative purposes. What proves a success in vitro may become a failure in vivo

and all theory may be thrown overboard by practice. As heretofore, each of us will have some special favorite which has served him faithfully, and wisely profit by his own and other authors' disappointments.

Discussion.—Dr. W. H. Luedde: Parke-Davis and Company recently sent a sample of their silver iodid suspension to the Eye Clinic, O'Fallon Dispensary. So far I have not used it, but I am curious to know if the silver iodid is as painless as it is claimed to be. Perhaps the last speaker could explain that point. I would like to use it in some of the cases where silver nitrate solution is not well borne.

Dr. Pitzman, in closing: In answer to Dr. Henderson's question, that is a matter of concentration. When you get the silver albuminate strong enough it will gradually kill the bacteria. As to the work of Schneider on "Leukins," I have studied the original and Dr. Alt's translation. It certainly represents an enormous amount of work and very honest work. I do not agree with his conclusions. He attempts to establish a new type of antibody under the name of "Leukine"—an antibody resisting heating to 56° C. for over an hour. Such an antibody, complement his really is, is unknown in established university work. I feel that Dr. Schneider does not exclude silver albuminate as the real antiseptic in his work.

In answer to Dr. Charles: The figures taken are purely arbitrary and diagrammatic. At times in spite of the fact that minus is recorded, there may be the slightest trace of clouding, of growth, which practically cannot be noticed. In the egg-albumin series the growth cannot be determined by inspection, and so those figures represent the result of culture.

In answer to Dr. Post: I consider argyrol a very poor germicide. To kill the staphylococcus in full strength it takes about twelve hours. When I say argyrol is a very weak germicide I do not disapprove of it in practice, except when used in a condition where a real germicide is required. In fact, I believe argyrol and collargol are the newer silver preparations which should be used, which have a real cause for existence. In place of the other silver preparations, I would advocate the use of very dilute solutions of straight silver nitrate, which is practically what they are. The treatment of ophthalmia neonatorum was based by Credè on the use of an active germicide, and it is pretty generally accepted that

a germicide must be used in order to make sure of killing the gonococcus. Just how strong or how weak, that of course is a question for the specialist to determine. It depends also on the individual how thoroughly it is applied. In this procedure I do object to the use of argyrol and collargol. Personally, I feel that you get results in the treatment of catarrhal mucous membranes not because you kill off the bacteria, but because of various other reasons.

Possible Misinterpretation of X-Ray Plate.

Dr. Alt stated that he would like to demonstrate two X-ray pictures of a case which came under his observation. The history was as follows: On the 1st of November, a boy nine years of age, came to see me, after receiving an injury to his left eye. It was utterly impossible to ascertain how he received the injury. I saw him on the fifth day, four days after the injury, and I found an abrasion on the upper lid, a very congested eyeball, and the conjunctiva chemotic. There was a wound three to four mm. long in the upper nasal quadrant, which penetrated exactly through the corneoscleral junction. The iris and some vitreous were wedged into the wound. Through the opening pus could be seen in front of the ciliary body. There was already a cataract, vision = 0. The pupil was still well dilated at that time. There were all the symptoms of a purulent cyclitis, perhaps, a panophthalmitis, and I tried very hard to find out whether there was a possibility of a foreign body in the eye. I was unsuccessful, since the boy would not tell how he was injured. When after a few days hypopyon developed, I sent him on the 10th of November to Dr. Carman to have an X-ray picture made. This X-ray picture showed five or six small foreign bodies in the vitreous. They were arranged almost in a line. When I received this plate, I was of course making up my mind that I should probably have to remove the eyeball, but since the eye became more quiet, I decided to wait, and it was not until a week afterward that it suddenly struck me when thinking about these foreign bodies that about two hours before the X-ray picture was made, I had dusted some xeroform into the boy's eye, which as you know is a bismuth preparation. I had another plate made by Dr. Garstang and this plate showed no foreign bodies. I thought this was an experience that might happen to any of

you gentlemen and be of help to you in case you have a similar difficulty. The eye is now getting very much better, the wound is closed, and there is good light perception. The boy never had any pain. I am now in hopes of perhaps being able to give some sight later on.

Hypopyon Keratitis Treated With Powdered Methylene Blue.

Dr. John Green, Jr., referred to Mrs. S. O., an elderly Jewish woman, who formerly had been under his care at the Social Service Hospital Dispensary for chronic conjunctivitis associated with ectropion, and who presented herself at his office November 27th.

Ocular history: The right eye had been very sore for two weeks; she was unable to sleep for several nights past and had been treated at two dispensaries without improvement. The right eye presented an oval, undermined ulcer of the cornea near the upper limbus with an hypopyon filling about one-fourth of the anterior chamber. The hypopyon was thick and dense and my impression was that the best thing to do was a Saemisch section. After discussing the case with Dr. Saxl, it was decided to adopt a method of treatment which had recently come to their notice through Dr. Woliner. This method consisted in the filling up of the ulcer with powdered methylene blue. I had previously had some experience with a weak solution of methylene blue (1/500) as an irrigating solution for lacrimal sacs and was favorably impressed with it. Accordingly, I cocaineized the eye and filled up the ulcer with the powdered methylene blue after using atropin, two or three times. The eye was then covered with a pad, held in place by Dr. Saxl's eye shield, and the patient allowed to go home. The following day the patient stated that, aside from a little "scratching" after the use of the powder, she had experienced no discomfort. The ulcer was decidedly cleaner, the upper edges much less infiltrated and there was apparently a cessation in the downward progress of the ulcer. The same treatment was repeated for three days in the course of which the hypopyon had almost disappeared and the eye seemed to be on the high road to recovery. Unfortunately the patient stopped coming, on the fifth day, so I cannot give you the final results of treatment. I have never seen more rapid improvement in hypopyon ulcer than under this treatment.

In answer to Dr. Charles' question as to how long I treated her before I began to use methylene blue, I saw the patient on Monday and began it that very day, and again Tuesday, Wednesday and Thursday. Dr. Saxl tells me that he has used this treatment in several cases with uniform success.

Discussion.—Dr. Alt: I have never used methylene blue, but almost exactly twenty-one years ago I reported to the St. Louis Medical Society my experiences with a preparation which was equally highly praised, if not more so and of similar character, if not exactly the same as methylene blue and that was methyl violet. I experimented with it very freely and very frequently in ulcers of the cornea. I did not use it in the same manner as Dr. Green used the methylene blue. I used a stick made of methyl violet, rubbed this over the whole ulcer, its edges and fundus, until all was stained deeply. My experiences were rather disappointing. As in Dr. Green's case, the patients always felt better; in some way or other it had an anesthetic effect; some of the ulcers healed quite rapidly, some did not do so well. Added to this was the disagreeable purple staining of the face and lids, which made the patients absolutely refuse to have it used again. As a general remedy, I have given it up, but I use it once in a while in inflammation of the lacrimal sac, where I found it to act very well. As we all know, new remedies when first brought out, seem for some reason or other to do just splendidly in the hands of their discoverers for a series of cases and then other cases come in which they do not do so well. However, I shall try the methylene blue in the manner recommended by Dr. Green.

Dr. F. E. Woodruff: I have tried the methylene blue not only in solution, but also in powder form in some ulcers of the cornea that were particularly deep seated and looked as though they were spreading and would probably result in perforation, and I have also used it where there was hypopyon and have always had immediate relief after the use of it. And I have seen it used in other cases which had gone on from bad to worse under treatment and a noticeable improvement began immediately after the use of it in solution or in powdered form.

Dr. Post: I would like to know from Dr. Green in regard to the staining qualities.

Dr. W. H. Luedde: In regard to the general use of the

methylene blue, I might add that, at the time I was in the City Hospital, we used it quite extensively in the treatment of acute urethritis. Dr. Rassieur, who is present this evening, can tell about the methods employed and the results obtained.

Dr. Louis Rassieur: Apropos of the action of methylene blue powder upon bacteria, I made the following experiments twelve years ago while interne in the St. Louis City Hospital: I had a virulent strain of typhoid organisms. I made a bouillon culture and added sterile methylene blue until the consistency became almost semisolid. The organisms were not killed but seemingly inhibited in their growth, for the hanging drop showed immense blue sluggish bacilli. To a similar tube I added basic fuchsin crystals and the result was an active fuchsin stained bacillus of almost normal size. To a third tube I added an excess of eosin. The result was a very short, almost coccal form of organism that was extremely motile. It is needless to add that new bouillon tubes inoculated from the above grew colorless typhoid bacilli.

Dr. Green, in closing: The ulcer itself was stained quite deeply blue, the conjunctival sac was superficially stained, but it could be washed out with boracic acid solution without any difficulty. When the eye was opened the day following the first use of the methylene blue, the gauze was stained blue, there was some pus on the gauze and the surrounding skin had a few flakes of methylene blue on it, but no stain.

In reply to Dr. Alt's question, I did not examine the pus microscopically.

J. G. CALHOUN, *Section Editor.*

PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

Meeting of December 14, 1911. the President, Dr. Wendell Reber, in the Chair.

Symposium on Muscles.

Dr. Zentmayer said that ordinarily he employed the Maddox rod for far and near, supplementing it by a test which he had found accurate and readily understood by the patient: an ordinary red glass is placed before one eye, the same eye is then covered by a narrow card; after waiting for a few moments the card is slowly drawn aside. As soon as the inner edge of the card has passed the visual line, if heterophoria be present, diplopia will be manifested. An illuminated disc $\frac{1}{2}$ cm., placed 6 meters away, is used for fixation. An error of $\frac{1}{2}$ degree can be detected by this test. For near, the same test may be employed, dispensing with the red glass and using a 1 mm. white square upon a black background, or using a red glass and a small electric lamp for fixation. The screen test he has found of value, but the parallax test has been found time consuming and only practicable with observing patients. Of its real value he has no doubt. He therefore does not use it routinely but as an essential test when operative interference is under consideration.

He believes that when there is a slight degree of esophoria, say from $\frac{1}{2}$ to 2 degrees for distance, and an exophoria of from 2 to 4 degrees for near, it is not likely to produce symptoms. The estimation of adduction and abduction is best done with loose prisms, and no value is attached to the amount of the former per se. A normal p.p. of convergence may be associated with a low prism degree of adduction.

In 150 consecutive private cases of refraction in which the patients had reported themselves free from the symptoms for which they sought relief at the end of from two weeks' to one month's time after the cycloplegia had entirely passed off, he had found hyperphoria present in 34 per cent. In 96 per cent of these it was 1 degree or less. In only two instances was it

above 2 degrees. In only one instance was it found necessary to regard the hyperphoria in the glass ordered. In 78 per cent the right eye was relatively the higher, i. e., there was right hyperphoria. In ordering glasses he ignores the hyperphoria where it is less than 2 degrees, and does not correct that amount unless the correction of the refraction error has failed to give relief. He believes the careful correction of refraction errors under atropin cycloplegia may be the explanation for the rarity of his being compelled to order vertical prisms. He would look for the uncovering of latent hyperphoria by the wearing of prisms where the hyperphoria has resulted from a secondary contracture following a congenital paresis of one of the vertical muscles. He is under the impression that except in actual esophoria, divergence insufficiency is more common than convergence excess. Prisms base out have given relief in this condition. In convergence insufficiency prisms base in have given relief, but have usually been ordered to be worn during the stress of near work. Dr. Zentmayer also stated that he wears a 1 degree prism in each eye himself at times.

Discussion.—Dr. Ring: I have nothing to add to the fullness of Dr. Zentmayer's experience, and I find that I agree with him largely in the question of vertical defects and their corrections. I think with him that more and more I want to get away from the short mydriatic and use the long mydriatic. I do not use atropin, but I use hyoscin very largely and homatropin at times. As far as the vertical defect is concerned, I feel that prisms should not be prescribed as much as they are. Certainly, not in less than $\frac{3}{4}$ and never less than 1 degree. May I ask Dr. Zentmayer how he deals with his cases of marked divergence deficiency, with adduction of 12 to 14 degrees and an abduction of 3 degrees? With exophoria I have, as you all have, many times had very good results from prism practice, but have gotten very little satisfaction by the use of prisms bases in.

Dr. Posey: I would like to say that I have used with advantage the red light that Dr. Zentmayer mentions, and I have further used the Maddox rod in much the same way. That is to say, when the patient's right eye has been refracted the screen is placed over the right eye and the left eye refracted. When this has been done the screen is removed from the right eye and the Maddox rod immediately slipped into its

place and the patient's attention is directed to a point of light directly to one side of the 5 5 line of letters on the card. In this way I am frequently enabled to unmask considerable latent hyperphoria. In a study of 2,300 of my private cases, 287 instances of hyperphoria were found. I think my practice in the use of vertical prisms is different from that of Dr. Zentmayer and Dr. Ring. I think that in a great many cases because hyperphoria of one degree or more frequently gives rise to masked symptoms, unilateral headache is frequently complained of. Refraction of such cases helps out, but not nearly so much as the wearing of vertical prisms. Personally I cannot see any harm in them. The argument of those who are opposed to their use is that any latent trouble is made more manifest. I have records of many cases in which the hyperphoria has become more and more manifest, but in my judgment it is not the use of the vertical prism that makes it more marked. I am very fond of using prism exercises for weak adduction. One point I would like to make is my belief that an esophoria of 2 to 3 degrees for infinity with an exophoria of 2 to 3 degrees at the reading distance constitutes normal balance. Whether this shall be called orthophoria is of course open to discussion.

Dr. Reber: As to the muscle balance at the near point, I find the Maddox rod and a tiny electric light to be held in the patient's hand a very practical method. Much valuable information is frequently overlooked by not estimating the muscle balance at the reading distance. Many a patient who shows 1 or 2 degrees of esophoria for infinity will reveal anywhere from 6 to 12 degrees of exophoria at the reading distance. When the muscle balance at the reading distance has been found, it is an extremely easy matter to remove the Maddox rod and estimate the patient's convergence near point by approximating the light to the patient's eyes and finding how close it may be carried without producing diplopia. Most patients will converge to at least $3\frac{1}{2}$ inches. The essential point is that the patient should have at least 13 meter angles of convergence. They cannot continually use more than 4 or 5 meter angles of convergence without becoming uncomfortable. Convergence training is one of the most valuable things we have at our command today. I believe in it firmly. Like Dr. Posey, I regard one degree of

hyperphoria or more as significant. If, as has been claimed, the hyperphoria is simply a symptom that the refraction has not been done correctly, why do so many people after forty-five years of age exhibit hyperphoria? In the presence of presbyopia the most accurate refraction can be done, and yet in spite of the most painstaking refraction this is the period of life in which hyperphoria is most in evidence. My own statistics as to hyperphoria indicate that right and left hyperphoria are of about the same occurrence. I have the records of over 300 cases of hyperphoria in my private practice, and I have made over 30 per cent of them comfortable by the use of vertical prisms.

In the discussion on Congenital Palsies, Dr. William Campbell Posey pointed out that the shape of the orbit is in general terms governed by the shape of the skull. If there is a peculiarly shaped orbit it is likely that the muscles will be attached to the globe in some anomalous fashion. A certain number of congenital squints are due to the use of instruments at the time of delivery. It is essential to make a diagnosis between congenital and concomitant squint. The latter can often be cured by proper correcting glasses and operation need not often be resorted to. Congenital squint will almost always require one if not more operations. It is not an easy matter to differentiate congenital and concomitant squint, particularly in a very young child. Generally there is either a faulty-acting muscle somewhere or a weakened muscle. One can often get an idea as to which muscle is palsied by observing the position of the head and body of the patient. In 1700 patients at the Wills Eye Hospital and the Howard Hospital there were 53 congenital squints as against 309 concomitant squints. Sometimes repeated operations are necessary in such cases before anything like parallelism of the ocular axes is secured.

Dr. Reber called attention to the fact that concomitant strabismus is generally due either to a high grade refractive error or defective fusion, or what is most likely, a combination of these two factors. He agreed with Dr. Posey that certain cases seemed to be due to instrumental delivery while a certain other portion are truly congenital. There is no denying, however, that a vicious factor in almost every case of strabismus (myopes excepted) is the abnormally active accommo-

dation. If this can be quieted by whatsoever means, much can be accomplished in the nonoperative treatment of strabismus.

Dr. Reber presented a case of anisotropia manifesting itself principally as an esotropia. The boy, who is now sixteen, has been under observation for twelve years, during which time he has been carefully refracted six different times. Ever since his sixth year it has been observed (with the cover test) that when the right eye is covered the left eye drifts down and outwards 5 mm., and that when the left eye is covered the right eye similarly drifts down and outwards 5 to 6 mm. Both the right and the left eye movements into position (when the cover is removed) are overdone. During each movement the upper meridian of the cornea is allowed to fall outward about 15 degrees temporalward. This is immediately righted in the corrective effort at fixation. The patient preferred to fix with the right eye in which the vision was 5/5, that of the other eye being 5/30. When the right eye was carried well to the right the left eye was rotated directly up and inward. The same is true when the left eye was carried well to the left, the right eye rotating directly upward and inward. This would rather point to bilateral paresis of the superior rectus with spasmodic over-effort on the part of the associated inferior oblique muscle in the opposite eye. But the findings with the tropometer entirely negative this supposition, the upward rotation in the right eye being 41 as against the normal 32, and the left eye being 50 as against the normal 36. On the other hand, the downward rotation in the right eye was defective, in that it showed 45 in the right eye as against the normal 52, and 40 in the left eye. Thus it is seen that both eyes are directed in a plane higher than the normal horizontal plane of the head. In spite of the most careful orthoptic treatment the apparent esotropia remains fixed at 30 degrees. It is perfectly evident, therefore, that it is a purely symptomatic one, the true condition being the anomalous state of the vertical muscles; operation upon the vertical muscles will probably correct the lateral deviation.

Dr. Zentmayer: I have never seen operation on the superior recti absolutely correct upward rotation of the eyes. Because of this patient's deficient downward rotation, it might be well to do an advancement of the inferior recti or tenotomy of the inferior oblique or both.

Dr. Posey: I do not think tenotomy of the inferior oblique alone would cure this case. As a rule, one cannot elicit double vision in congenital squint, but the vision does not greatly deteriorate in one eye as it does in concomitant squint. The congenital squinters use both eyes. This young man now has 5/45 vision. Dr. Reber has said that when he was first seen he had only 2/60 vision, but that now he has 5/45. I have only seen one case of true anisotropia before in my life. The little girl who presented this condition was one of twins. Each eye would deviate upward from 7 to 10 mm., under cover. She wears a + 1.00 sphere at times. If very tired she will have a slight cast in her eye.

D. FOREST HARBRIDGE,

Secretary.

BOOK REVIEWS.

Retinoscopy—(Or Shadow Test).

By JOS. THORINGTON, A. M., M. D. Published by P. Blakiston's Son & Co., Philadelphia. Price, \$1.00.

This is the sixth edition of this book, with sixty-eight pages of text and sixty-one illustrations. A careful and complete description is given of the armamentarium, and its proper employment, the errors to be avoided, and the method of determining the correct refraction. The only criticisms are that the author is perhaps a trifle too enthusiastic, and that he neglects to give an explanation of the manner in which the shadow is formed.

C. L.

The Adjuvant Treatment of Strabismus.

Le traitement adjuvant du strabisme. By Dr. F. TERRIEN, Professeur Agrégé à la Faculté de Médecine; Ophthalmologist to the Hôpital des Enfants-Malades, and HUBERT, ancien Assistant Ophthalmologist to the Hôpital. In one vol.: 300 pages, with 137 figures in the text. Published by G. Steinheil, Paris. Price, 4 francs.

The authors discuss first strabismus in general, and then the correction of divergent and convergent strabismus by means of appropriate lenses. The chapter on Essential Strabismus and Binocular Vision is especially interesting. The remainder of the book is taken up in a well written discussion of orthoptic principles and their application in the treatment of strabismus.

C. L.

Testing of the Eye.

Die Funktionsprüfung des Auges für Studierende und Aerzte. By DR. ANTON ELSCHNIG, O. Ö. Universitätsprofessor und Vorstand der deutschen Universitäts-Augenklinik in Prague. Second revised edition. Published by F. Deuticke, Leipsic and Vienna.

In this book of 200 pages Prof. Elschmig has given a re-

vised edition of his work published in 1896. The chapter on external muscles of the eye has been practically rewritten. As a comprehensive and well written survey of the methods for testing the eye, and the principles underlying them, this work can be well recommended for students and practitioners.

C. L.

THE ANNALS OF OPHTHALMOLOGY

Vol. XXI

JULY, 1912

No. 3

XV.

SIMPLE SENILE CATARACT EXTRACTION WITH INCISION OF THE ROOT OF THE IRIS.

PROF. DR. A. ELSCHNIG,

DIRECTOR OF THE GERMAN UNIVERSITY EYE CLINIC IN PRAGUE.

TRANSLATED BY HARRY S. GRADLE, M. D.,

CHICAGO.

In the extraction of senile cataract, the omission of the iridectomy and the preservation of a round pupil are to be desired, both from theoretic considerations and from practical experience.

As is well known, when the eye is not perfectly adjusted optically, the circles of diffusion on the retina are proportional to the size of the pupil. Consequently, under these circumstances of imperfect adjustment, the smaller the pupil the sharper are the images. With a round pupil there are no dazzling phenomena in a strong light, and the injurious effects of ultraviolet rays upon the retina, which have been so recently studied, are avoided. Of course, in a normal eye these rays are absorbed by the lens. Moreover, the eye can protect the retina against a sudden excess of strong light only if the pupil is round.

The practical experiences coincide fully with the theoretic considerations. I have never seen erythropsia, which occurs so frequently, appear in a patient where the cataract was ex-

tracted with a round pupil, while vision is unquestionably better and the visual power is less sensitive toward defects in the correcting glass (decentration, oblique position, insufficient correction, etc.). I have repeatedly observed intelligent patients who required only a spherical lens for distance correction, use this glass for reading the finest print by merely increasing the distance of the glass from the eye. The realms of the so-called pseudoaccommodation are vastly increased by a round pupil in consequence of the obliteration of the circles of diffusion. In addition to these optic advantages, the cosmetic results of a round pupil cannot be too highly valued.

The frequency of iris prolapse stands as the most important hindrance to the general adoption of simple cataract extraction, i. e., extraction without iridectomy. Numerous operators have advocated various methods to prevent prolapse of the iris, but until recently none of them seem to have earned a permanent place in the realms of operative ophthalmology. A few years ago Hess¹ again advocated the peripheral iridectomy which was first employed by Bell Taylor in 1871. This consisted in the excision of a small piece of iris root directly underneath the corneal incision, thus preventing a prolapse of the iris during the process of wound healing, and preserving the round pupil. Hess reported 600 such extractions with only 0.66 per cent of iris prolapses.

Influenced by these results, which were made public at the Budapest International Congress of Medicine in 1909, I commenced using the peripheral incision of the iris advocated by Bajardi in 1895, and up to the 15th of February, 1912, have operated 287 eyes by this method. In two cases iris prolapse occurred, due, I believe, to insufficient incision of the iris. The first case was a very corpulent woman, 74 years old, with prominent bulbi, who was so extremely restless during the extraction that it was impossible to determine whether the iris root was actually incised or not. The second case, a woman 76 years old, was operated upon by one of my assistants during my vacation, and suffered an iris prolapse several hours after the extraction. But in this case the iris was replaced and the round pupil preserved. However, in this eye, too, no incision of the iris root was visible, so that in all probability

1. Wittmer and Nagano. 600 Extraktionen von Alterstar mit peripherer Iridektomie. Arch. f. Augenheilk., Bd. LXVI, S. 33, 1910.

the attempt at incision had been a failure. Even if these two cases, wherein probably the technic was at fault, had been considered among the total number, the percentage of prolapses would be only 0.7 per cent; in other words, not more than the same percentage occurring in extraction combined with iridectomy.

The procedure is as follows: After the regular incision and capsulotomy have been performed, the corneal flap is grasped with a forceps and laid back. The iris, completely exposed, is then incised close to the scleral lip of the wound with the small pointed branch of a de Wecker scissors (Esbach scissors), practically raising a fold of the iris and making an incision about 1 mm. long parallel to the edge of the cornea. (Fig. 1.) In order not to mutilate the surface of the iris too badly, the incision must be kept well near the scleral lip of the wound, for the incision through the limbus (comprising one-third to two-fifths of the circumference of the cornea) is well subconjunctival. The operators who prefer a primary peripheral incision will undoubtedly find the iris incision easier nearer the root of the iris.

Of course, the iris incision can be made immediately upon opening the eye, but I consider it better to carry out the more important capsulotomy first before the patient has become tired. In those cases that show the maximal mydriatic effect of the cocain, even after the capsulotomy, the iris incision should be made after delivery of the lens and reposition of the iris, for the danger of incising the body or the sphincter of the iris is too great. Injury of the vitreous is, of course, possible, but improbable when proper care is exercised.

If the operator has had no experience with this technic, it is much safer to perform the iris incision with the lens present. If the incision be too large, the upper edge of the lens may present itself herein instead of in the pupillary area, as occurs so frequently with a peripheral iridectomy. However, this can be easily replaced by light pressure with the spatula. As emphasized before, this incision must lie in the root of the iris and must not be longer than 1 mm. After smooth reposition of the iris and the conjunctival flap, a few drops of eserine are instilled and an adhesive plaster bandage applied over both eyes. On the same afternoon the bandage is loosened, and on the next morning atropin is instilled and the second eye left open.

In many cases the iris incision is but scarcely visible after the wound has healed. (Fig. 2.) In six of the 287 cases some iris tissue on one or both sides of the iris incision was adherent to the posterior surface of the corneal wound, thus causing the pupil to be slightly eccentric, but never was the iris included in the wound.

How this iris root incision prevents prolapse is so simple that it does not need any explanation. Unquestionably it is the pressure of the aqueous which collects behind the iris and

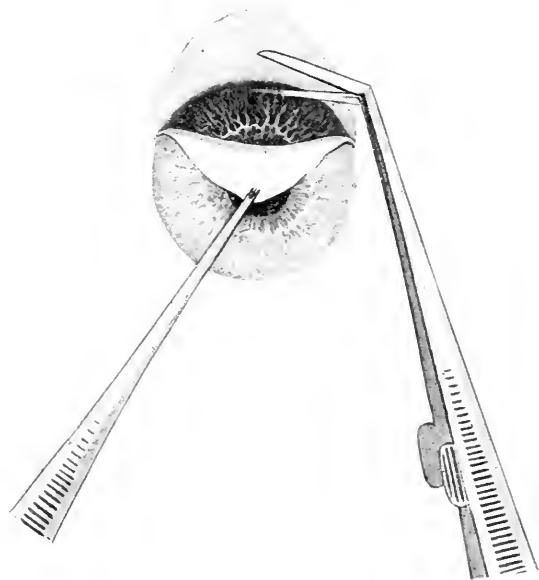


FIGURE 1.

balloons this forward, forcing open the corneal wound and jamming the iris into it. This occurs especially when the patient "squeezes," i. e., causes pressure with the lower lid against the lower portion of the cornea. I believe that a contributing factor toward this is the adhesion between the iris and the remnants of the anterior capsule, or, in case of a Smith extraction, the vitreous. Thus there results a ring shaped synechia such as we find in cases of iritis (*iris bombé*), bulging forward of the iris, opening of the corneal wound, and incarceration of

the iris in the wound. The "squeezing" of the patient contributes greatly to this.

As a result of my experience I believe that the iris root incision is a positive preventive measure against iris prolapse in simple extraction. Still I am not of the opinion that every case can be extracted without an iridectomy. During the time that I performed the 287 simple extractions, I also performed 61 extractions with iridectomy, among them 26 extractions intracapsular, according to the Smith technic.

The simple extraction is absolutely contraindicated if a previous instillation of homatropin does not produce a mydriasis of at least 5 mm. The recognition of the rigidity of the iris, which cannot be decided by any morphologic characteristics, will determine whether a lens with a large nucleus can be delivered through a round pupil without tearing the sphincter or otherwise destroying the integrity of the iris.

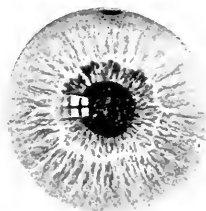


FIGURE 2.

In contradistinction to these absolute contraindications to simple extraction, the two previously mentioned must be regarded as relative. To the danger of iris prolapse due to very prominent eyes, abnormally wide palpebral fissures, or unusual tenseness of the lids, one must always add the fact that the patient may be of such a character that a reasonable behavior after the operation cannot be expected. Every "squeezing" by the patient during the first twenty-four hours may cause a gaping of the wound and a prolapse.

To the relative contraindications must also be added adiposity, heart lesions (high blood pressure), and bronchitis, especially when complicated with emphysema. Disturbances of metabolism belong to this group, for they may cause the frequent iritis post extractionem. But I have successfully performed many simple extractions in patients in whom one or more of the above mentioned relative contraindications existed.

XVI.

ANOTHER CASE OF CHLOROMA.

ARTHUR J. BEDELL, M. D.,

ALBANY.

The bond between the special fields in medicine is becoming closer every year. The object of this paper is to record a case of chloroma and refer to a report of another already published, thus evidencing the broad relationship between ophthalmology and general medicine. Because of the rarity of the lesion and the frequency of ocular involvement the subject seems of sufficient interest to warrant the citation of these cases with a list of reported experiences. While the true significance of chloroma is not thoroughly understood, and although its general classification is in doubt, it is probably a systemic condition with local symptoms. This last statement may not pass unchallenged, but it is admittedly the opinion of those pathologists and hematologists whose experience with this disease gives their authority most weight.

CASE 1.—J. L., male, aged 8, of foreign birth, was first seen December 3, 1906.¹

General Examination.—Extremely emaciated, skin distinctly yellowish, mucous membranes anemic; the right eye proptosed 11 mm., both lids somewhat discolored with bluish tinge but freely movable, palpebral veins enlarged; appearance of a growth in the upper part of the orbit due to slight edema. The lower orbital ridge was definitely outlined, but a firm, freely movable tumor mass 12 mm. wide extended from the outer to the inner canthus. This mass was free from skin, conjunctiva and bone. Its posterior border was not distinctly palpable. Bulbar and palpebral conjunctiva negative, except for two 5 mm. irregular, subconjunctival hemorrhages near the limbus over the external rectus. Cornea clear, anterior cham-

1. Merrill and Bedell: Chloroma, with Special Reference to the Ocular Symptoms, New York State Jour. Med., October, 1907.

ber negative, iris normal, pupil 4 mm., active, media clear. Marked optic neuritis was present with complete obliteration of the disc outlines; white exudates along the larger vessels, but in no other part of the retina; no retinal hemorrhages; vision, fingers at 6 feet; complete ophthalmoplegia externa. The left eye was extremely prominent, extending 20 mm. beyond the superior orbital ridge. The temporal, frontal, angular and supraorbital veins were enormously distended and tortuous, with dark-blue lids. Projecting beyond the upper orbital margin was a firm growth not adherent to the surrounding structure. It seemed to extend deep into the orbit and was palpable from the supraorbital foramen outward beyond the outer canthus. Closure of the lids was impossible; conjunctiva markedly chemotic, with numerous ecchymoses; cornea clear above, the lower half covered with yellowish masses of dried exudate; anterior chamber and iris negative. Pupil 5.5 mm., but does not react to light or accommodation. Deep in the vitreous a yellowish gray reflex was obtained, but no fundus details; no light perception; complete ophthalmoplegia.

Blood Examination.—Dr. Rooney's examination of the blood November 26, 1906, showed:

Reds	1,596,000
Whites	41,200
Hemoglobin	30.0 per cent
Color index	1. + per cent

Differential count of 400 whites:

Polymorphonuclears	37.9 per cent
Large mononuclears	11.0 per cent
Small mononuclears	12.0 per cent
Eosinophils	3.1 per cent
Myelocytes, neutrophilic	32.8 per cent
Myelocytes, eosinophilic	7.2 per cent

Poikilocytosis; many micro- and macrocytes; many degenerated whites.

Dr. A. T. Laird's blood examination, December 8, 1906, showed:

Reds	1,410,000
Whites	79,600
Hemoglobin	30.0 per cent

Differential count of 6,000 leucocytes:

Polynuclears	16.2 per cent
Large mononuclears	5.3 per cent
Large lymphocytes	15.3 per cent
Transitionals	0.8 per cent
Eosinophils	0.7 per cent
Small lymphocytes	33.0 per cent
Neutrophil myelocytes	28.2 per cent
Eosinophil myelocytes	0.5 per cent

Five nucleated red cells were noted; three were normoblasts, two were larger than normoblasts and were classed as megaloblasts. A number of degenerated leucocytes were seen, but no record of them was made.

Operation.—The patient was given chloroform and a 3 cm. incision was made over the outer half of the superior orbital ridge. The entire orbit was filled with a greenish mass of almost cartilaginous consistence, having a definite capsule in parts, no large blood vessels and not palpably adherent to the periosteum. The optic nerve could be definitely outlined, but the ocular muscles could not be distinguished. Palpation to the apex of the orbit proved that the entire content consisted of this pale green tumor.

The tissue removed was sent to Dr. R. M. Pearce of the Bender Laboratory, who reported as follows:

Pathology.—Tissue from the left orbit. Material consists of three small pieces of tissue, the largest about 0.5 cm. in diameter. These are irregular in shape; in part firm, of light greenish color, and in part soft and pink in color. On section they show a uniform smooth surface, firm in the green portions and soft in the pink portions.

Histology.—The centers of the nodules are composed of closely arranged cells of the type of the larger lymphoid cell. These have a deeply but slightly irregularly staining nucleus and a small ring of eosin-staining protoplasm. As a rule, they are round or slightly oval in shape, but occasionally are irregular, resembling in a general way the plasma cell. No multinucleated cells are seen. Toward the periphery are single fat spaces which have resisted the general infiltration. These spaces are more abundant at the extreme periphery, but the tissue between is extensively invaded by the new cells. Only

here and there are many small areas of uninvolved fat tissue seen. Here also are areas apparently at the point of periosteal attachment, with considerable fibrous tissue infiltrated with lymphoid cells, more or less hyaline in character. In the center of the nodules there is but a faint reticulum of indefinite arrangement. Few blood vessels are seen; polymorphonuclear leucocytes are not present in appreciable numbers.

Subsequent Course.—The patient's condition grew progressively worse from date of admission. Emaciation was extreme. Proptosis of both eyes became more marked. Tumor mass on the right side increased 2 mm. in width and the eyelid became more darkly congested, and the vessels tortuous and prominent. Vision was almost totally lost, but owing to the patient's mental state, could not be determined definitely. Pupil 6 mm., not reacting. No increase in the retinal changes. The left eye began to show signs of lagophthalmic keratitis. The lower half of the cornea was infiltrated and the outer layers eroded. No fundus was visible; no decrease in the chemosis; veins more enlarged.

December 10th, at 11 a. m., the child had a convulsion which started with general muscular tremor of the right side, followed by marked spasm with rotation of body toward the left. This side was entirely paralyzed, respirations stertorous, patient unconscious, but at times seemed semi-conscious. Further observation of his condition prior to death on the same day was prevented by his removal from the hospital. Autopsy was not permitted.

The second case was under observation nine days, during which time complete examinations were made by Dr. Wollbach.

CASE 2.—Mrs. N. G., aged 18, married, a Russian by birth, was admitted to the Albany Hospital on the service of Dr. G. Emory Lochner, April 7, 1909. Family and personal history negative. Patient menstruated from 13 years of age until one week after marriage, July, 1908. One month prior to admission she first noticed many small, hard, insensitive lumps in each breast, which she believed had not increased in size. March 8, 1909, she had "pink eye," from which she seemingly recovered; on March 27th, her eyes began to bulge, causing pain and attacks of blindness.

General Examination.—The patient was an undersized, delicately built, poorly nourished woman. The skin had a pecul-

lar satiny texture and was of grayish yellow color. Several nodules about 2 cm. in diameter, which were attached to muscle and bone, were palpable in each breast and along the sternum. The axillary and inguinal glands were enlarged. The woman was eight months' pregnant; a systolic murmur was audible over the whole precordium and not transmitted. These were the only departures from an otherwise negative physical examination, except for the ocular lesions and blood changes.

April 8th, the right eye proptosed 20 mm., immobile. The upper lid showed great dilatation of the blood vessels, and although it covered one-third of the cornea, it might be retracted, while the lower lid was covered with chemotic conjunctiva. A definitely palpable tumor mass 20 by 12 by 8 mm. was outlined over the lacrimal gland, entirely in the lid, with no deep attachment. The superior two-thirds of the cornea was clear, but the lower third showed a dense interstitial and superficial haze. Pupil, 1.5 mm. Vision, fingers at 3 feet.

Left eye proptosed 18 mm.; small nodule in the upper lid at the outer side; cornea hazy below, pupil 4.5 mm., stationary. Vision, fingers at 3 feet. A large mass of grayish appearance pressed the retina forward, and, except for an occasional vessel, obscured fundus detail.

Blood Examination.—Blood examination made by Dr. James F. Rooney, April 8th, showed:

Reds	3,150,000
Whites	36,500
Hemoglobin	55.0 per cent

Differential count of 300 white cells:

Polynuclears	15.8 per cent
Lymphoblasts	37.2 per cent
Small mononuclears	37.0 per cent
Large mononuclears, transitionals	9.0 per cent
Eosinophils	0.8 per cent
Mast cells	0.2 per cent

Five normoblasts seen in counting 300 leucocytes.

Four days later, April 12th, the condition was much as shown in Figure 1. The right eye bulged forward 25 mm., with intense engorgement of veins of lids and temporal region.

The tumor mass was now 25 by 12.5 mm., axis 60 degrees, not adherent to the skin or periosteum, although extending deep in the orbit. The outer part of the lower lid was filled by an oval, unattached growth 18 by 9 mm., axis 120 degrees.

The lower half of the eyeball, including the entire cornea, was exposed.

The conjunctiva was chemotic, with many small ecchymoses, and a small hypopyon in the anterior chamber. Tension nor-



FIGURE 1.—Case 2.

mal; vision, light perception; pupil 2 mm., stationary; extremely limited motion of the globe.

Left eye proptosed 22 mm., with many irregular nodular growths in the upper, outer two-thirds of the orbit, close to the superior wall, but not adherent; upper half of the cornea covered by a vein-filled upper lid, the lower half rough, beginning to slough; eyeball stationary; bulbar conjunctiva decid-

edly congested; the interior of the eye unchanged; anterior chamber negative. Pupil 45 mm.; faint reaction to light; tension normal.

Dr. Rooney's blood examination, April 12, showed:

Reds	2,200,000
Whites	52,000

Differential count of 300 whites:

Lymphoblasts	45.2 per cent
Polynuclears	10.6 per cent
Small mononuclears	19.2 per cent
Large mononuclears and transi- tionals	8.0 per cent
Eosinophils	3.0 per cent
Myelocytes	0.7 per cent
Degenerated	1.0 per cent
Six normoblasts, one megaloblast.	

April 16th the patient died, after premature delivery of a dead child. As in many cases, persistent uncontrollable nasal hemorrhage was present for several days before death.

The following is the autopsy report of Dr. Wolbach, held April 16, 1909:

Autopsy.—Portion of breast tissue excised three hours post-mortem shows glandular and fat tissue invaded by many tumor nodules from a few mm. up to 3 cm. in diameter. These nodules are of firm consistence and vary in color from a light green, the color of cooked peas, to an olive green.

Autopsy limited to chest and abdomen and done under a very short time limit.

Body is that of a short-statured, slightly built white woman. There is extreme double exophthalmos and both eyeballs are reddened and covered with puriform material and crusts. Breasts are large and nodular. The areolæ are deeply pigmented. Midline of the abdomen is deeply pigmented. Rigor mortis is complete. Marked postmortem lividity of dependent parts. No edema.

Peritoneal Cavity: Peritoneum is smooth, moist, glistening. Appendix normal. Mesenteric lymph nodes not enlarged.

Chest: Under surface of the sternum is covered with many green tumor nodules which are situated on the surface and

beneath the periosteum. The intercostal muscles on both sides for a distance of several cm. are invaded and replaced by tumor tissue which completely surrounds the costal cartilages of the upper five or six ribs.

Pleural and pericardial cavities negative.

Heart: Normal in size. Myocardium is of good consistency. Valves and endocardium are normal. There are three tumor nodules in the auricles of the heart situated as follows: one in the posterior wall of the left auricle near the interauricular septum. This nodule is olive green in color and measures 2 by 1.5 cm. In the interauricular septum just above the mitral valve and close to the posterior border is a nodule 0.5 cm. in diameter, which is pale green in color. In the wall of the right auricle in the posterior side close to the interauricular septum is a similar nodule 1 cm. in diameter.

Lungs: Both are negative, except for edema and congestion. At the root of the left lung, presumably in mesenteric nodes, are two pale green tumor nodules about 1.5 cm. in diameter.

Spleen: Normal in color and consistency.

Liver: Pale, reddish brown in color, normal in size and consistency. No tumor nodule found on close inspection.

Pancreas: There is a mass of large green glands at the head of the pancreas. On section these vary in color from a pale green to an olive green. Imbedded in the tail of the pancreas are two similarly colored nodules about 1 cm. in diameter.

Gastrointestinal Tract: Not opened.

Kidneys: Both kidneys are normal in size, pale in color, and each contain many nodules varying in size from 2 mm. to 1.5 cm. The largest are situated beneath the capsule and are flattened and soft in consistency. Smaller ones are distributed throughout from cortex to pyramids, and are firmer in consistency. These nodules are of rather pale color but of a decided green tint. The larger ones show small red areas, presumably hemorrhages.

Adrenals: Both are normal.

Prevertebral lymph nodes are markedly enlarged. On the left side, just above the bifurcation of the aorta, is a large mass of pea green tumor tissue which is firmly attached to the periosteum covering the vertebræ. This mass is roughly

hemispheric in shape with a base 5 cm. in diameter and a depth of 3 to 4 cm. Consistency is very firm.

Genitalia: Uterus large and has a partially contracted appearance of a recent delivery. Ovaries and tubes normal. Owing to lack of time, genitalia were not more closely inspected.

Fresh microscopic examination of the tumor shows it to be

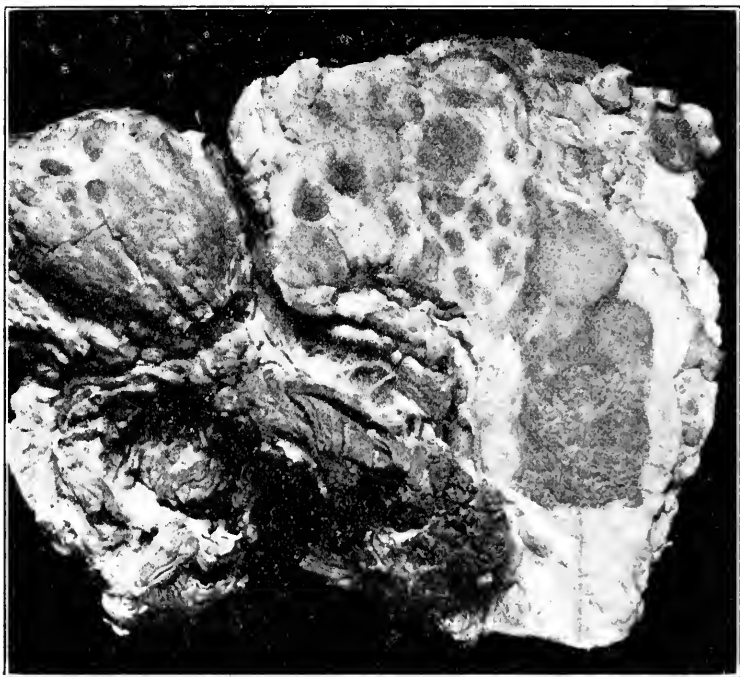


FIGURE 2.

Breast and subjacent pectoral muscle showing tumor nodules of varying size and diffuse tumor growth (natural size).

made up of small round cells, a few of which contain many refractive granules. The fluid obtained by teasing and expressing glands contains many refractive globules which on exposure to fumes of osmic acid turn dark brown. Tissues preserved in Zenker's fluid, Fleming's fluid, formaldehyd solution, absolute alcohol, methyl alcohol, acetone, Kaiserling and saturated solution of chloral hydrate.

Breasts: Both breasts and surrounding fat tissue are largely replaced by green tumor tissue. The growth consists of spherical and ovoid masses from a size just visible up to nodules 3 cm. in diameter. These nodules are of quite firm consistency. The color varies from a pale green to an olive green.

Anatomic Diagnosis: Chloroma with metastases to sternum, heart, bronchial nodes, kidney, pancreas and lymph nodes.

The following pathologic report is made by Dr. Thomas Ordway, director of the Bender Laboratory:



FIGURE 3.

Heart: Fragment showing large tumor nodule in the wall of the auricle at a. This lies above and to the right of a portion of the mitral valve c and above the coronary vein d; part of the wall of the left ventricle is seen below b (natural size),

PATHOLOGIC REPORT.

Microscopic Examination.—The tissue available for this examination² had been in part fixed in 10 per cent dilution of liquor formaldehydi and in part preserved by the Kaiserling method, by Dr. S. B. Wolbach, who also, as indicated in the preceding protocol, carefully fixed tissue in Zenker's fluid, Flemming's fluid, absolute alcohol, methyl alcohol, acetone,

2. No bone marrow or tissues, other than indicated below, were available for this study, owing to the limitations placed on the postmortem examination.

and saturated solution of chloral hydrate. This tissue will form the basis of a special pathologic study to be reported later by Dr. Wolbach, to whom I am indebted for the opportunity of this preliminary study of the formaldehyd and Kaiserling material. Large sections for topographic relations were imbedded in celloidin and stained by hematoxylin and eosin and by van Giesen's connective tissue stain. Smaller fragments were imbedded in paraffin and stained by eosin and methylene blue (Wolbach's colophonium modification) and hematoxylin and eosin. Teased preparations and frozen sections were examined unstained and stained by Scharlach R. and hematoxylin and Scharlach R.³

The new growth consists of nodules widely disseminated throughout the body, involving the breasts, sternum, bronchial and retroperitoneal lymph nodes, the heart, pancreas, and kidneys (Figs. 2, 3 and 4). Most of the tumor masses appear as discrete circumscribed nodules. On microscopic examination, however, the tumor cells at the periphery trail off into and diffusely invade the adjacent tissues. In some areas, even in the immediate neighborhood, the tumor growth is diffuse, with a tendency, however, to the formation of nodules.

Tumor Character of Cells: The tumor consists of closely packed cells in general resembling those of the lymphocytic series; they are chiefly of the embryonic type. The nucleus is large, round or oval and the chromatin in many has a reticular appearance like that of the plasma cell; the nucleus also is in some eccentrically placed. The cytoplasm is variable in amount, usually moderate, and takes a neutral or slightly acid or basic stain. Many of the nuclei are vesicular. There are also cells having fine and coarse granules with deeply staining reticular nuclei resembling the cells of the myeloma or myelocytes. Mitotic figures are frequent.

Among the tumor cells is a delicate reticulum, similar to that of lymph nodes, with endothelial cells and a variable amount of connective tissue. The latter depends in great part on the character of the tissue invaded. In parenchymatous organs little connective tissue appears in the tumor (Fig. 7). When dense fibrous connective tissue is invaded, it is split up and becomes incorporated in the tumor as stroma. The

3. I am indebted to Dr. Ellis Kellert for assistance in the sectioning, staining and photographic work. The photographs were made by Mr. J. A. Glenn.

endothelial-like cells occasionally contain more than one nucleus, two to four, and resemble the type of giant cell occurring in the scirrhus lymphoma or so-called Hodgkin's disease.

Eosinophilic cells are common, many resembling the eosino-



FIGURE 4.

Kidney (outer surface): Scattered throughout and projecting from the cortex are numerous tumor nodules varying from 1/25 mm. in diameter up. The clefts indicate areas from which tissue has been excised for microscopic examination (natural size).

philic myelocytes, and others the adult polymorphonuclear eosinophils. There are other cells in general resembling the tissue mast cell so frequently seen in chronic inflammatory processes, and especially marked in tissues fixed in formalde-

hyd. The granules of many of these cells take a neutral or slightly acid stain; in some, however, the granules are large and appear like the so-called secretion granules in secretory epithelium. In others the granules are small and take a decidedly acid stain. There is no sharp distinction between these and the eosinophilic cells above mentioned.

Frozen sections and teased preparations of tumor nodules from the breast, preserved in Kaiserling solution, and still having a distinct apple green color, unstained, show occasional cells with small refractive greenish granules. These, however, are not numerous; no evidence of them is found in frozen sections stained for fat by Scharlach R, while the normal fat of the breast and the degenerating gland cells take a brilliant scarlet color. It is possible that the examination of the fresh tissue and that immediately fixed in solutions containing osmic acid, may be of value in determining the origin of the pigment. Such a preliminary examination has already been mentioned by Dr. Wolbach in the above protocol. Sections fixed and stained in the usual way show no evidence of pigment.

Breast: The glandular tissue has in some areas been entirely replaced by the tumor cells, which appear in large and small masses resembling lymphoid tissue. Although the tumor cells tend to occur in circumscribed foci, from these "centers," the cells diffusely invade the adjacent fat, fibrous and glandular tissue. The glandular epithelium shows all stages of degeneration, the cells occurring in masses of varying size, separated and invaded by the tumor (Fig. 5). The clear, circular vacuole-like areas in the epithelial cells take on a brilliant red color similar to the adjacent fat tissue of the breast when frozen sections are stained by Scharlach R. Many of the ducts are dilated. In the vicinity of the degenerating glandular tissue there is a varying number, in places an abundance, of large so-called compound granule cells, endothelial-like cells containing droplets, and granules sharply stained red by Scharlach R.

Large and small nerves are surrounded, apparently pressed on and invaded by the tumor. Numerous ganglion cells, containing abundant yellow to brownish pigment, are similarly surrounded and show a varying degree of degeneration. Some are swollen and others are shrunken. The chromatic material

is massed at the periphery of the cells. In many of the fibers myelin sheaths have persisted, and in others there is marked degeneration. Among the necrotic glands and ganglion cells

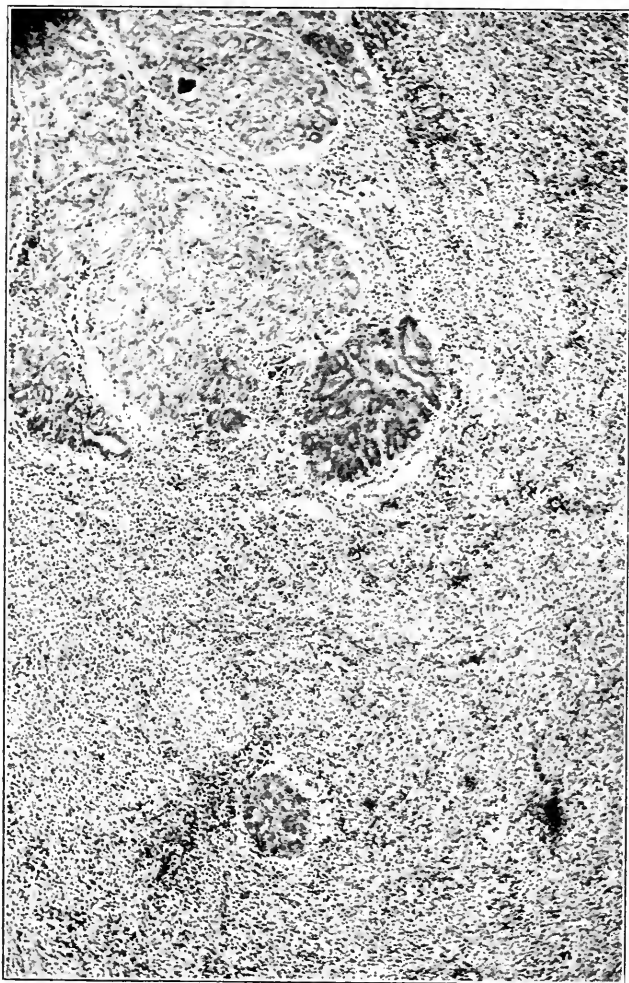


FIGURE 5.
Breast: Glandular tissue invaded and separated by the tumor (x 65).

are varying numbers of polymorphonuclear leucocytes. In places the tumor cells are massed beneath the endothelium of the lymphatics. Where the tumor invades dense fibrous tissue, bundles of collagen fibrils are split up and appear scat-

tered throughout the tumor mass as stroma, the abundance of this depending on the variety of tissue invaded.

Sternum: The intercostal muscles, fascia and adjacent fat and fibrous tissue are diffusely invaded by the tumor, the cells of which infiltrate the perichondrium and rarely penetrate it (Fig. 6). In one place, cells resembling the tumor occur in close relation to the marrow of the sternal end of one of the

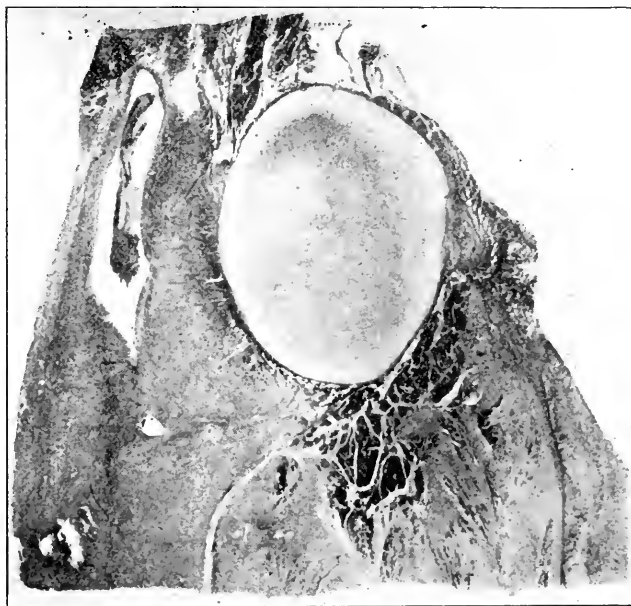


FIGURE 6.

Sternum: Section showing costal cartilage almost surrounded by tumor, the cells of which have invaded the intercostal muscle, adjacent fat and fibrous tissue and the wall of a large blood vessel (to the left), and are present in large numbers in the lumen (x 5).

ribs. The tumor cells resemble those above described. A large lamellar, or Pacinian corpuscle, at the edge of the perichondrium, is found surrounded by tumor cells. By the connective tissue stain the reticulum and stroma of the tumor in the neighborhood of the dense perichondrium, appear exceptionally abundant, and are clearly seen in the form of a delicate tracery among the tumor cells. Most of this is due to the

inclusion of the separated fibrillæ by the growth and invasion of the tumor. The muscle fibers invaded show a varying degree of degeneration. The wall of a large vein near a costal cartilage is involved by the tumor and a large number of tumor cells are within the lumen (Fig. 6).

Lymph Node: The normal structure of the lymph node is obscured by the invasive tumor growth. Occasionally at one end of a node not completely invaded, cords of lymphoid tissue and lymph follicles can be recognized. Here the sinuses are filled with large and small lymphoid cells and many eosinophils. These areas not involved by the tumor have the appearance of a marked, chronically inflamed lymph node. Between these portions and those invaded by the tumor, the lymph channels are distended by the tumor cells. Here also an occasional blood vessel is found, the wall infiltrated by tumor cells which elevate the endothelium and are present mixed with red blood corpuscles within the lumen.

Kidney: The tumor masses are in the form of large and small foci; the cells are not sharply circumscribed, but trail off among and diffusely infiltrate the glomeruli and tubules, which show all stages of degeneration (Fig. 7).

About and within the necrotic tubules are varying numbers of polymorphonuclear leucocytes; the cells of the convoluted tubules in the vicinity of the tumor are swollen, homogeneous, or vacuolated; in some are abundant hyalin droplets. Except for this excess of polymorphonuclear leucocytes, the tumor presents the general characteristics above described.

Heart: The tumor nodule in the wall of the auricle above the mitral valve (Fig. 3) has infiltrated the muscle fibers, many of which are separated or replaced by the tumor; others show a varying degree of degeneration. The subepicardial fat and the wall of the large coronary vein are likewise invaded. The tumor cells occur in masses beneath the endothelium of the vein, which in places is absent. In the subepicardial fat a large lymphatic is seen distended by tumor cells.

Liver: Sections reveal no distinct tumor nodules; in the periportal connective tissue, however, there are numerous cells of the lymphocytic series and eosinophils. In the sinusoids also, particularly near these areas, are similar cells in varying numbers. The hepatic cylinders contain a moderate to marked amount of yellowish granular pigment. The general appear-

ance of the liver suggests rather that of myelogenous than of lymphatic leukemia.

The pancreas and adrenals are negative.

Summary of Microscopic Findings.—The tumor is widely

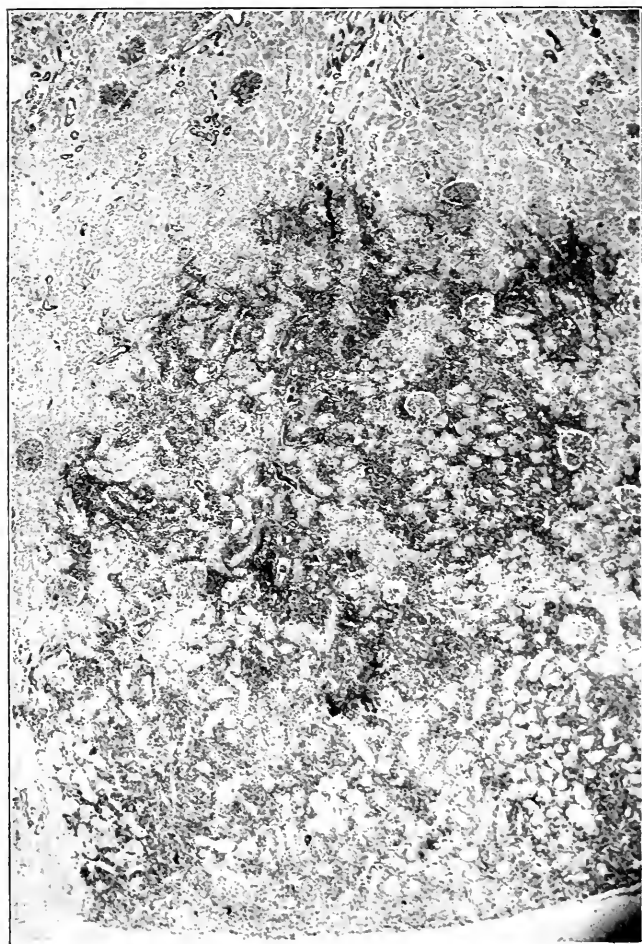


FIGURE 7.
Kidney: Tumor diffusely infiltrating cortex (x 35).

disseminated and occur in more or less circumscribed foci; it also shows diffuse and transitional forms of growth. The extension may be by way of the lymph or blood streams, as tumor cells are found both beneath the endothelium and within lymphatics and blood vessels.

The predominating cells are of the lymphocytic series and occur in a delicate reticulum; this contains a varying amount of connective tissue, depending on the nature of the tissue invaded. Cells of the myelocytic series and endothelial cells, single and multinucleated, occur in varying numbers.

Tissues invaded by the tumor undergo different forms of degeneration with resulting acute and chronic inflammatory reaction of slight to moderate degree. This is characterized by the presence of polymorphonuclear leucocytes, eosinophils, mast cells, lymphoid and endothelial cells; many of the latter are phagocytic for products of cell degeneration.

The nature and source of the pigment is not evident, but preliminary observations show that this may be determined by subsequent study of fresh or suitably fixed tissue. Such pigment is not found in tissue fixed and stained in the usual manner.

Pathologically the disease is characterized by growths, most frequently multiple, in connection with the bones of the face, orbit and other regions. Macroscopically the growths vary in color from a dark olive to a very light pea green which fades rapidly on exposure to air or the various fixation fluids. The color is probably due to a lipochrome which is found in extremely variable amount even in the cells of the primary growth.

The blood picture is held by Dock, Warthin, and Jendrassik, among others, to be characteristic, the lymphoblasts largely predominating, with a moderate to pronounced anemia, usually with extremely few megaloblasts. The neutrophilic myelocytes in the majority of cases are relatively in small numbers. Toward the latter stages of the disease degenerated leucocytic forms, together with erythrocytic deformity and polychromia without stippling, make their appearance.

The ocular manifestations are many and varied, and, therefore, will not be considered in detail, as the cases here reported are characteristic.

I wish to express my thanks to Dr. Ordway for his report and the many kindnesses shown me, to my residents, Drs. McSorley and Munson, for their interest, and to Dr. Lochner for the opportunity of recording this case.

BIBLIOGRAPHY.

Alt, Adolph: Ayers Case with Additional Microscopic Examination and Photograph. *Am. Jour. Ophth.*, March, 1897.

Aran: *Arch. gén. de méd.*, 1854-55, series 5, i-iv, 385 (Dock).

Arnold and Becker: Doppelseitiges symmetrisch gelegenes Lymphadenoma der Orbita. *Arch. f. Ophth. (Graefe)*, 1872.

Axenfeld: Zur Lymphombildung in der Orbita. *Arch. f. Ophth.*, 1891, xxxvii, 102.

Ayers, S. C.: A Case of Chloroma. *The Jour. A. M. A.*, 1896, xxvii, 986.

Balfour: Case of Peculiar Disease of the Skull and Dura Mater. *Read Dec. 3, 1834. Edinburgh Med. and Surg. Jour.*, 1835, p. 319.

Behring and Wicherkiewiez: Ein Fall von Metastasiren dem Chlorosarkom. *Berl. klin. Wehnschr.*, 1882, No. 33, p. 509.

Beneke: Verhandlungen der Deutsch. path. Gesellsch., 1898. (Discussion on paper of Hansemann on Acute Leukemia.)

Benjamin and Sluka: Das Chlorom. *Jahrb. f. Kinderh., etc.*, Berlin, 1907.

Bergmeister: Chloroma of Orbit. *Ztschr. Augenh.*, 1909, xxii, 544.

Bernheimer: Bericht über die, Heidelberger Ophth. Gesellsch., 1889, p. 199.

Birk: Ein interessantes Fall von Leukämie. *St. Petersburg med. Wehnschr.*, 1833, viii, 377.

Bock: Lymphoma Orbitae sinistrae. *Wien. med. Wehnschr.*, 1898, No. 32, p. 1559.

Boerma: Ueber einen Fall von symmetrischen Lymphomen in der Orbita. *Arch. f. Ophth. (Graefe)*, 1894, xl, 219.

Bramwell: Notes on a Case of Chloroma and of Three Cases of Lymphatic Leukemia. *Scottish Med. and Surg. Jour.*, 1902, x, 219; *Lancet*, London, 1902 i, 520; *Brit. Med. Jour.*, 1902, ii, 453.

Bruce: Chloroma of the Jaws. *Ann. Surg.*, January, 1910.

Burns, Allen: Observations on the Surgical Anatomy of the Head and Neck. Baltimore, 1823, p. 386.

Bushke: Ueber ein Fall von symmetrischen sarkomatösen Tumoren der Schläfenregionen und der Wangen. *Chlorom. Berl. med. Gesellsch.*, July 5, 1905.

Butler: A Case of Chloroma. *Brit. Med. Jour.*, April 20, 1907.

Calderaro: Chloroma bilaterale della orbita. *Clin. Oculistica*, 1903, quoted by Meller.

Chiari: Zur Kenntnis des Chloroms. *Prag. Ztschr. f. Heilk.*, 1883, iv, 177.

Collins, Treacher: *Ophthalmic Hosp. Rep.*, 1891, xiii, Sec. 248.

De Graag: Lymphatische Leukämie und Chlorom. *Geneeskundige Bladen u. klin.*, 1904; *reg. in Ergebn. d. allg. Path. u. path. Anat.*, x, 760.

Felens: Observations de tumeurs lymphadéniques des deux orbits. *Arch. d'opht.*, 1886, vi, 155.

Dittrich: *Prag. Vrtljschr. f. d. prakt. Heilk.*, 1846, ii, 104.

Dock: Chloroma and Its Relation to Leukemia. *Am. Jour. Med. Sc.*, July, 1893, p. 152.

Dock and Warthin: A New Case of Chloroma with Leukemia. *Tr. Assn. Am. Phys.*, 1904.

Dreschfeld: Ein Beitrag zur Lehre von den Lymphosarkomen. Deutsch. med. Wehnschr., Oct. 13, 1891, p. 1175.

Dreschfeld: Acute Hodgkins' Disease. Brit. Med. Jour., April 30, 1892, p. 893.

Dressler: Ein Fall von sogenanntem Chlorom. Virchow's Arch. f. path. Anat., 1866, xxxv, 605.

Frozda: Akutes Leukämie mit eigenartigen an Chlorom erinnernden Obductionsbefund. Gesellsch. f. inn. Med., Oct. 23, 1902; Wien. klin. Wehnschr., 1902, p. 1236.

Dunlop: A Case of Chloroma with Pathologic Report and Some Notes Descriptive of the Disease. Brit. Med. Jour., 1902, i, 1072.

Dunn: Leukemia with Rare Lymphoid Growths of Orbit and Parotid Glands. From Trans. College Phys., Philadelphia, 1893, p. 103; Ophth. Rev., 1894, No. 151, p. 167.

Durand and Fardel: Jour. hebdom. d. progr. d. Sci. inst. méd., Par., 1836, iii, 207.

Gade: Nord. Med. Ark., xvi, No. 19.

Gade: Comptes-rendus, xvi, No. 22, p. 20.

Gayet: Sur les tumeurs symétriques des deux orbites et leur caractère symptomatique. Arch. d'Ophth., 1886, vi, 15.

Guembel: Ueber das Chlorom und seine Beziehung zur Leukämie. Virchow's Arch. f. path. Anat., etc., Berl., clxxi, 504.

Gulland and Goodhall: The Pathology of Lymphatic Leukemia and Chloroma. Jour. Path. and Bacteriol., June, 1906.

Hall and Hebla: Chloroma. Brit. Med. Jour., March 6, 1909.

Harris and Moore: Preparation from Case of Chloroma Before Manchester Pathological Society. Lancet, London, 1902, i, 525.

Herz: Zur Frage der gemischten Leukämie. Wien. klin. Wehnschr., 1909, p. 1030.

Heyden: Das Chlorom. 1904, Inaug. Diss., Rostock.

Hichens: Some Remarks on a Case of Chloroma. Brit. Med. Jour., Dec. 26, 1903.

Hillier: Recurrent Tumor of the Orbit, Followed by Similar Growths on the Other Side of the Head, on the Dura Mater and Under Costal Pleura. Tr. Path. Soc., London, 1855, vii, 337.

Hitschmann: Ein Fall von Chlorom mit ausgebreiteten grünen Hautinfiltraten. Wien. klin. Wehnschr., 1905, p. 1470.

Hochheim: Arch. f. Ophth. (Graefe), 1902.

Höring: Ein Beitrag zur Kenntnis des Chloroms. Inaug. Diss., Tübingen, 1891.

Houng: Arb. a. d. Path. Anat. Inst. zu Tübingen, 1891, part 1, p. 180.

Hospital, St. Bartholomew's: Autopsy report, Chloroma, 1906.

Huber: Studien über das sogenannte Chlorom. Arch. d. Heilk., 1878, xix, 129; quoted by Behring.

Jacobaeus: Beiträge zur Kenntnis der myeloiden Chloro-leukämien. Deutsch. Arch. f. klin. Med., 1909, p. 7.

Kelsch and Vaillard: Ann. de l'Inst. Pasteur, iv, 276; quoted by Dreschfeld.

Kerschbaumer: Ein Beitrag zur Kenntnis der leukämischen Erkrankung des Auges. Arch. f. Ophth., 1905.

King: A Case of Chloroma. Month. Jour. Med. Sc., Edinburgh, August, 1853, xvii, 97.

Klein and Steinhaus: Ueber das Chlorom. Centralbl. f. allg. path. Anat., 1904, xv, No. 2.

Koerner: Ein Fall von Chlorom beider Schläfenbeine, etc.

Ztschr. f. Ohrenh., 1896, xxix, 92; also Arch. Otol., 1897, xxvi, 289.

Kottmann: Die Symptome der Leukämie. Inaug. Dissert., Berne, 1871.

Krokiewicz: Ein Fall von Chlorom multiplex. Wien. klin. therap. Wchnschr., 1905, No. 3.

Lang, Gustave: Monographie du Chloroma. Arch. gén. de méd., November, 1893, and January, February and March, 1894; De quelques cas récents de chloroma ou cancer vert. Ibid., July, August and September, 1898.

Leber: Ueber die intercellularen Lücken des an dem Hornhaut Epithels im normalen und pathologischen Zustände. Arch. f. Ophth., 1878, xxiv, 252.

Lehndorff: Zur Kenntnis des Chloroms (Chloroleukämie, Chloroleukosarkomatose). Jahrb. f. Kinderh., July 1, 1910.

Lehman: Ein Fall von Chlorom. St. Petersburg med. Wchnschr., Sept. 7, 1906.

Leighton: Note on the Demonstration of Eosinophil Granulation in the Cells of Chloromata. Jour. Path. and Bacteriol., October, 1907.

Lubarsch: Koerner's Case. Ztschr. f. Ohrenh., xxxii, 129; and Arch. of Otol., 1898, xxvii, 450.

Mackenzie, William: A Practical Treatise on Diseases of the Eye. Philadelphia, 1855.

Meixner: Zur Kenntnis des myeloiden Chloroms. Wien. klin. Wchnschr., May 16, 1907.

Meller: Die lymphomatösen Geschwulstbildungen in der Orbita und im Auge. Arch. Ophth., 1905.

Merrill and Bedell: Chloroma, with Special Reference to the Ocular Symptoms. New York State Journal of Medicine, October, 1907.

Osterwald: Arch. f. Ophth., xxii, Abth. 3, p. 203.

Paltauf: Lymphosarcom, etc. Ergebn. d. allg. Path., 1896.

Panas: Dacryoadénite double d'origine amygdalienne. Semaine méd., 1895, No. 5, p. 37.

Paviot and Fayolle: Un nouveau cas de prétendu cancer vert. Province méd., 1897, xi, 139.

Paviot and Gallois: Essai sur la vraie nature du cancer vert. Lyon méd., 1896, xxxiii, 486; Province méd., 1896, x, 570.

Pfeiffer: Ueber das Chlorom des Schädels—ein typisches Krankheitsbild. München méd. Wchnschr., Sept. 25, 1906.

Pinkus: Nothnagel's Encyclopedia of Practical Medicine. Am. Ed., 1905, ix.

Pope and Reynolds: A Case of Chloroma. Lancet, London, May 18, 1907.

Port and Schutz: Zur Kenntnis des Chloroms. Deutsch. Arch. f. klin. Med., Oct. 23, 1907.

Risel, W.: Zur Kenntnis des Chloroms—Based on One of Rosenblath's Cases. Deutsch. Arch. f. klin. Med., 1902, lxxii, 31.

Rosenblath: Ueber Chlorom und Leukämie. Deutsch. Arch. f. klin. Med., 1902, lxxii, 1.

Schmidt, Otto: Ueber einen Fall von Chlorom. Inaug. Dissert., Göttingen, 1895.

Sternberg, Karl: Ueber lymphatische Leukämie. Verhandl. d. Deutsch. path. Gesellsch., 6 Tagung, 1903, p. 30; also Demonstration, Wien. klin. Wchnschr., 1902, p. 55; Wiener Briefe, München. méd. Wchnschr., 1902, No. 3, 126.

Sternberg: Zur Kenntnis des Chloroms, Chloromyelosarkom. Beitr. z. path. Anat. u. z. allg. Path., 1905, part 3.

Stevens, J. L.: A Case of Acute Leukemia with Numerous Subcutaneous Lymphomatous Nodules, Chloroma. Glasgow Med. Jour., 1903, ix.

Sutherland, P. R. A Case of Chloroma. Scottish Med. and Surg. Jour., 1902, ii, 137.

Treadgold: Chloroma and Acute Lymphatic Leukemia with an Account of Four Cases and a Discussion of the Pathology of the Disease. Quart. Jour. Med., April, 1908.

Trevithick, E.: A Case of Chloroma, etc. Lancet, London, July 18, 1903; a note; *ibid*, p. 530.

Tuerk, W.: Wien. klin. Wchnschr., 1902, p. 55; Gesellsch. f. inn. Med., Dec. 12, 1901.

Turk: Wien. letter in discussion. München. méd. Wchnschr., 1902, No. 3, p. 126.

Von Recklinghausen: Allgemeine Pathologie, 1883, p. 440.

Waldstein: Chlorolymphoma. Arch. f. path. Anat., xci, 12.

Weeks: Diseases of the Eye, 1910, Chapter, xxiv, 634.

Weinberger, Maximilian: Discussion Prep. Chlorom. Gesellsch. f. inn. Med., in Wien, Feb. 26, 1903; Wien. klin. Wchnschr., 1903, p. 461.

Weinberger: Ueber lymphoides und myeloides Chlorom sowie dessen Beziehungen zur lymphoiden und myeloiden Leukämie, Ztschr. f. Heilk., February, 1907.

XVII.

THE EARLY SYMPTOMS AND THE OCULAR FINDINGS IN A CASE OF CEREBRAL TUMOR.

OSCAR WILKINSON, M. D.,

WASHINGTON.

Miss D. C., aged 25 years, came to me on November 3, 1911, and gave the following history: She had been troubled with basilar headaches, for which she had been treated by her family physician, who called it "nervous neuralgia." On awakening in the morning she could not open her eyes until after she had had her coffee. She complained of severe pain in the back of the neck, in both eyes and back of the left ear, associated at times with a "buzzing" in both ears, and this had been so severe on one or two occasions as to cause nausea and vomiting, for which she had been obliged to call in her physician. She had been employed for the previous six months addressing envelopes, addressing as many as one thousand per day, and attributed her pains to overuse of her eyes.

I had first seen her in March, 1906. At that time she complained of burning in the eyes and severe headaches. I gave her correcting lenses which relieved her. I saw her again in February, 1907, when she complained of having a return of the headaches. She had discontinued the use of her glasses and was doing close work. At this time she also complained of a ringing in her ears. She had a slight catarrh of the left ear associated with postnasal catarrh. I reordered the same lenses and treated her for catarrh once or twice a week for about five weeks, when she was relieved of the ringing noises in her ears and also of her headaches.

I had not seen her from that time until November 3, 1911. Examination of her eyes on that date gave the following:

R. + 0.62 $\overline{-}$ 0.25 cyl. ax. 180, V. = 65.
L. + 0.62 $\overline{-}$ 0.25 cyl. ax. 180, V. = 65.

She had $4/5^\circ$ of left hyperphoria; no lateral defect of the muscles; fundus of each eye normal and tension normal. The above correction was ordered.

She returned on November 8th; had not had any relief from her headaches. I then gave her calomel and a tonic of nux vomica, gentian and quinin. She came back on November 12th, and told of having been very ill after taking the calomel, although I had given her only $1\frac{1}{4}$ grains. I saw her again on November 18th; she had seen double that morning while dressing, and twice on her way to my office. On examination I could find no diplopia, either far or near; the movements of the eyes were normal, vision of the right eye was reduced to $6/9$, and the ophthalmoscope showed a very well marked case of papillitis. The left eye was normal. As she had had headaches early in the mornings and now had developed a papillitis, I decided to put her on specific medication, although I could not obtain the history of any specific lesion. I ordered her potassium iodid, five drops in water after meals, increasing to ten drops within a few days, and gave her protoiodid pills, $1/6$ of a grain, t. i. d.

On November 24th she returned, still complaining of headache, but had no return of the vomiting and nausea. She was unable to sleep on account of the pain, so I gave her codein sulphate to be taken at night. The papillitis in the right eye was now more of a choked disc, and the left eye showed very well marked papillitis, but the vision in this eye was still normal, vision of the right eye remaining $6/9$.

On November 26th I had a telephone message that she had spent a very bad night, was much nauseated and unable to retain anything on her stomach. She had taken $1\frac{1}{2}$ grains of calomel the previous day, to which I attributed the nausea and vomiting. She was in such distress I gave her a hypodermic of heroin, $1/12$ grain, and had a report the following morning that she had spent a comfortable night. At this time she was taking 15 grains potassium iodid, t. i. d., and her gums were slightly affected by the protoiodid pills. The papillitis had increased in the left eye, but remained stationary in the right. She complained of such severe pains in the eyes that I ordered cold and hot applications to the eyes and an ice pack to the back of the neck, which afforded her much relief.

I left the city on the evening of the 29th of November and

returned on the night of the 30th. Early on December 1st I was called by her sister, who informed me that the patient was much worse and had been unable to retain her urine for the previous twenty-four hours. I called Dr. Roy and took him to see her. He then took charge of the medical treatment, and has kindly furnished the following report:

"I saw D. C. with Dr. Oscar Wilkinson, December 1, 1911. On my first visit the mentality of the patient was good, with the exception of short periods of laughing and crying, attended with irrational expressions—what is usually termed an hysterical state—but not the "psychic trauma" of Sigmund Freud. There was no paralysis; no change in the reflex; skin sensations were normal; no diadokokinesia. From December 6th to the time of her death there were no marked mental changes, the patient was stupid, and only for short periods would the mind be even partially clear. At times after December 6th there seemed a difference in the muscular power of the two sides, but owing to her mental condition, we doubted the accuracy of our observations. It was only from the eye examination that diagnosis of the organic brain lesion was at first made.

The postmortem showed a brain tumor filling the left lateral ventricle, going a little over to the right side. The location of the tumor explained the negative neurologic history in the case, because the location was a negative one. The only tissue the tumor had pressed upon was the left fornix. The case was an ophthalmologic triumph; the skill of the neurologist could not be tested."

On December 2d I took the field of vision for the first time and then was unable to get any field for color, she being practically unable to discern any color until it was within 5° of the point of fixation. The field for light was normal in each eye.

On December 5th, her condition gradually growing worse, her mind being decidedly impaired, whereas up to December 1st it was exceedingly active, I suggested, in order to remove any possible element of doubt in regard to the papillitis being present, that I would ask Dr. Newell to see the case with me. On the same day Dr. Newell saw the case with Dr. Roy and myself, and he concurred in the diagnosis of a very well marked case of papillitis in both eyes.

The papillitis and general condition of the retina pointing

so strongly to a brain tumor or some lesion of the brain, Dr. Roy suggested that a neurologist be consulted, and accordingly Dr. T. Williams was called to see the case. There being no indication of any specific lesion in the brain, the patient was sent to a hospital where she could be more closely watched. During the following two weeks she remained in the hospital, having no abnormal temperature, no paralysis, and no new symptoms except that her strength failed and her mind became weaker, so that by the fifth day after entering the hospital she could no longer recognize her own relatives. She remained in the hospital until December 26th, when she was taken home, the lesion of the brain not having been located. Her condition became gradually worse and she was cyanotic at times. She was taken back to the hospital, and consent to a decompression operation was given by her parents.

This operation was performed by Dr. W. P. Carr, who made a large flap of the right parietal region and explored the brain for a tumor, but found nothing except a great pressure which caused the brain to bulge out through the wound; there was also a deficiency of cerebrospinal fluid. The patient was cyanotic before being brought to the operating table, but the cyanosis cleared up on opening the brain; however, she was practically in extremis during the latter part of the operation and lived only twelve hours after it.

A postmortem examination of the brain showed a tumor situated in the left lateral ventricle. This was a sarcomatous mass, almost round, well encapsulated and about two inches in diameter.

The ocular disturbances in this case were evidently due to a general pressure upon the brain caused by the gradual enlargement of the growth.

The eyegrounds were practically unchanged from about the 24th of November until her death on January 3, 1912. Once during her stay in the hospital the right eye showed some clearing up of the papillitis, and the general edematous condition of the retina was not so marked.

XVIII.

SECONDARY GLAUCOMA IN INTERSTITIAL KERATITIS, WITH REPORT OF A CASE.*

EDWARD A. SHUMWAY, M. D.,

PHILADELPHIA.

That changes in intraocular tension may occur during the course of interstitial keratitis is a fact that has been known for a long time. von Graefe called attention to it in 1869, in his article on glaucoma in the *Archiv. f. Ophthalmologie* (Vol. XV), saying that a softening of the eyeball is not uncommon, and the reduction may be to as low a tension as — 2; that if this occurs as a result of shrinking of an organizing exudate, the ultimate effect on vision is very bad, but otherwise restitution ad integrum usually occurs. On the other hand, the tension may be occasionally increased, though very rarely. This increase may be the result of seclusion of the pupil, when there has been accompanying iritis, but it may likewise occur when the iritis has been very slight and there is no pupillary seclusion. Greeff in his monograph on parenchymatous keratitis, in Vossius' "Sammlung zwanglosen Abhandlungen aus der Gebiete der Augenheilkunde," in 1897 (p. 11), says likewise that in rare cases the intraocular tension is affected. At times it is somewhat lowered, but a rise in tension is rare, and occurs only after long existence of the disease. This is also confirmed by Hoor, in his valuable monograph on the subject in the same series (Vol. VII, 1909), and the larger textbooks on ophthalmology mention it as a possibility. Fuchs, for instance, says that "the intraocular tension is not rarely changed in parenchymatous keratitis. Usually it is lowered, so that the eyeball appears softer, without, however, suggesting at once beginning atrophy of the ball. Only rarely is increased tension observed, and in fact usually when the keratitis has led

*Read before the Section on Ophthalmology of the College of Physicians of Philadelphia, March 21, 1912.

to ectasia of the cornea; the rise in tension occurs at times only after years." Secondary glaucoma is also mentioned by de Schweinitz, de Wecker and Landolt, Wells and others, but not by Noyes, Panas, Lawson, Roosa, etc., and as my experience is limited to one case, and conversation with other members of the Section indicated that they could remember very few such cases, I thought it worth while to bring before you a typical case.

The patient is a young man, J. M., aged 20 years, who has been under the observation of Dr. Wm. T. Shoemaker and myself for the last five years, at the German Hospital. At the time of his first visit in June, 1907, he had a well established attack of interstitial keratitis, which had commenced nearly a year before. Both corneas were hazy, there were fine posterior synechiæ and moderate ciliary flush. The teeth were ridged, but were not of the true Hutchinson type. A tuberculin test was made, but a negative result was obtained. He was given tonic treatment at first, with atropin and dionin locally, and later was put on inunctions of mercury, followed by increasing doses of iodid. Vision was reduced to ability to count fingers, but gradually improved, as the corneas cleared, to 6/60 in the right, and 3/60 in the left, eye. The attack slowly subsided, and he disappeared, but returned in February, 1909, with fresh injection in each eye, and increased corneal opacities. This attack was again treated with mercurial inunctions and was of shorter duration. In August the eyes were irritated for a time as the result of getting paint in them, and in December, 1911, after a year's freedom from inflammation, he noticed that vision was again becoming dim and the eyes were painful. The anterior ocular vessels were congested and vision was reduced to 2/60 in the right, and 1/60 in the left, eye. The attack subsided rather quickly, and on February 16, 1912, he was given an intravenous injection of salvarsan. On February 19th he complained to me that his vision had failed very decidedly within two days, in his good eye, and that he had had considerable pain. The cornea of the right eye had cleared sufficiently to allow a good view of the eye-ground, and examination showed that the optic nerve was deeply cupped, the cupping involving almost the entire nerve head, the nerve was atrophic and the vessels were displaced toward the nasal edge of the cup. Tension was + 1. The

left nerve could not be seen because of the corneal opacity, but its tension was also elevated. The field of vision of the right eye was contracted, especially on the nasal side, and for colors was reduced almost to fixation. That of the left eye could not be obtained, as vision was too poor. The atropin was stopped at once, and $\frac{1}{4}$ per cent eserin used, which contracted the pupils and relieved the pain, but tension remained above normal. He was therefore admitted to the University Hospital, where the diagnosis was confirmed, and the tension, estimated by the Schiötz tonometer, was found to be 45 mm. of mercury. As the writer was incapacitated on account of a broken arm, Dr. de Schweinitz was good enough to perform Lagrange operations on each eye. The right eye was operated on March 5th, and the left eye on March 12th. Both wounds have healed, though the left chamber was slow in closing. Vision March 21st was $5/60$ in the right, and $1/60$ in the left, without correction. Both nerves are cupped and partially atrophic.

The history then is one of typical parenchymatous keratitis in a young boy, with three separate attacks during a period of six years, through a greater portion of which time he was using atropin instillations. There was at no time severe iritis, and while there were several narrow posterior synechiæ, the pupils were not secluded. Finally secondary glaucoma appeared, causing deep cupping of the nerve heads, and necessitating iridectomy.

Isolated reports of glaucoma occurring in parenchymatous keratitis in the literature are rare. Hirschberg reported a case of congenital glaucoma, with corneal opacities, on which he successfully performed iridectomies, in 1906 (*Centralbl. f. prakt. Augenheilk.*, June). This was the first case of the kind he had seen. In 1905, Spicer published an article on keratitis profunda in the *Ophthalmic Review*, in which he reported four cases of rise of tension in fifty-four patients. Erdmann saw also three typical cases of Fuchs' keratitis disciformis, which were complicated by rise of tension (*Zeitschr. f. Augenheilk.*, 1909, p. 30), and says that Gruenert saw glaucoma in one out of seven cases of the same disease, and Meller had seen it once as a temporary condition. According to Erdmann, other corneal conditions in whose course glaucomatous rise of tension may occur, are herpes zoster corneæ, and allied herpetiform

types, such as keratitis dendritica, stellata and vesiculosa. Posey reported a case before the Section in November, 1905, in which there was a triangular patch of opacity in the cornea with secondary glaucoma, but he considered the corneal condition secondary to uveitis.

As to the etiology of the glaucoma, two types must be distinguished. In the one we have those cases which have been accompanied by severe iritis, and the secondary glaucoma results from seclusion of the pupil, and blocking of the main filtration channels in this way. The others, in which there is no such pupillary seclusion, must be explained in another way. According to Fuchs, they are due to coexisting involvement of the uveal tract, especially of the ciliary body and choroid. It is believed by almost all well known writers that the cases of parenchymatous keratitis in which the uveal tract, or at least a part of it, is not diseased are the exception, and while increase in tension is uncommon in simple iritis, it is very common in cyclitis and choroiditis. The usually accepted explanation of the rise in tension in cyclitis is that the amount of albumin in the aqueous is increased, so that the filtering spaces in the ligamentum are partly blocked by a coagulum or by leucocytes. This makes the process of filtration or exosmosis more difficult, and the chamber becomes deeper instead of shallower, as in primary glaucoma. In addition to the abnormal condition of the aqueous, a tendency to glaucoma may exist in anatomic peculiarities of the filtering angle, or a narrowing of the circumferential space, which Priestly Smith has found in many cases, and the prolonged use of atropin over many months, as in the present patient, may convert a temporary rise of tension, such as occurs in cyclitis, into a chronic glaucoma, with permanent rise of tension, cupping of the optic nerves, narrowing of the visual fields, and reduction of vision.

The occurrence of glaucoma in interstitial keratitis complicates very much the treatment of a case. Atropin should be stopped or used very cautiously, if the patient can be kept under observation. Eserin may be tried, but it is very apt to increase the irritation; a combination of pilocarpin and dionin may be useful, but if the glaucoma persists, paracentesis of the anterior chamber should be performed. This acts by removing the abnormal contents of the anterior chamber, is often very effective, and may be repeated. Iridectomy or one of its

modifications should be done as soon as possible, but must usually be postponed until the inflammatory symptoms have subsided. Fortunately, as Fuchs says of cyclitis, it is rare that the rise of tension is so lasting that the eye would become blind without immediate operation; usually it is only temporary, although it may appear several times during the course of the disease.

XIX.

SYMPATHETIC OPHTHALMIA.*

DR. F. DEUTSCHMANN,

HAMBURG.

TRANSLATED BY T. T. BLAISE, M. D.,

MASON CITY, IOWA.

Gentlemen:—

Although the researches on sympathetic ophthalmia during the past years have been numerous, and a vast amount of work and keen observation have been applied in this domain, I am yet unable to give you a generally recognized definition for this disease. Of most importance is the fact that the disease of the one eye is dependent upon a chronic uveitis of the other. To this point we must adhere, and from it you may draw the conclusion that the diagnosis is especially a clinical one. Usually the patient's first affected eye presents a perforation of the bulbus of traumatic origin, or has passed through an operation, followed by a chronic inflammation of the deeper parts of the eye. After an indefinite time—usually from four to eight weeks—although intervals of ten days, and as long as thirty years, have been recorded—the second, sympathizing, eye suddenly becomes affected, without any signs of the existence of a general disease. Most frequently there appears as the first symptom, fine deposits on Descemet's membrane, followed quickly by a severe iridocyclitis and choroiditis. Less frequently does the lesion affect only the choroid, while the anterior portions of the eye and the refractive media remain unaffected. Ophthalmoscopically one can observe more or less numerous yellowish foci in the choroid which often recover completely. Another form exists, known as papilloretinitis sympathica. The ophthalmoscopic picture of

*Read before the Medical Association of Hamburg, January 30, 1912.

this presents a moderately severe papillitis which is not very conspicuous, and is surrounded by a slight retinal opacity. It has the peculiarity that immediately after enucleation of the first eye, the process gradually recedes without further treatment, and without leaving any permanent injury to the optic nerve. Very rarely does a partial optic atrophy occur; a total atrophy has never been observed. This degeneration may appear primarily without ophthalmoscopically visible inflammatory changes on the nerve, and may be considered as a sequence of a retrobulbar neuritis, which may be diagnosed in advance in some cases through the increase in size of the blind spot.

Sympathetic ophthalmia is usually a severe disease and always of dubious prognosis, and therapeutically no specific remedy is known to stay the progress after the onset of the attack, the treatment being limited chiefly to inunction of gray ointment, large doses of salicylates, iodids and warm applications. Prophylaxis alone proclaims here its triumphs, since we are certain to have saved the second eye, if after a lapse of four weeks following the enucleation of the eye suspected of sympathetic ophthalmia we still find the other one uninvolved.

The microscopic findings are not nearly in all cases sufficient to base upon them alone a correct diagnosis. Weaker inflammations, exclusive of those that have recovered, are scarcely available for microscopic work, since only the seriously injured eyes are enucleated, and even then we must make allowance for a mixed infection as well as the lesion caused by the trauma itself. The sympathizing eye alone offers an absolutely true picture, and this has been examined in fifteen cases only. Briefly summed, the following may be said: Anatomically the sympathetic inflammation as well as the sympathizing inflammation present the same picture. The point of interest here is an infiltration of the uvea, which may arise in its different parts as an isolated affection, or may involve the entire uvea, and consists chiefly of plasma cells, besides lymphocytes, mast cells and eosinophils, leucocytes—which are chiefly found in the layer of the larger vessels. The onset is usually in discrete foci, but confluent foci may appear early. The denser the cell aggregations, the thicker the choroid becomes; the choriocapillaris remains for a long time uninvolved, and rupture of the hyaloid membrane is very infre-

quent. The iris and ciliary body are involved much more quickly in this infiltration process, the cells which appear on their posterior surfaces uniting into a kind of granulation tissue which may ultimately become indurated. The sympathizing inflammation in this stage cannot be distinguished from a chronic posttraumatic inflammation, since it presents at times pneumococci, staphylococci and streptococci, as is shown by the researches of Gilbert.¹ Despite this, it may injure the second eye, as has been several times reported recently. Following the further continuation of this sympathetic infiltration there appears the development of epithelioid and giant cells in all structures of the diseased eye. This is the most frequent finding in the sympathizing eye when sympathetic ophthalmia already exists. It has been pointed out from various sources that the pictures presented here remind one decidedly of tuberculosis, but the microscopic diagnosis in this stage of the sympathizing inflammation may be made with considerable certainty when it is known that the eye in question has become diseased in connection with perforation of the ball. The appearance of this second stage, which Fuchs² declares "typical," is probably not due alone to lapse of a definite period of time, but depends upon a certain virulence of the exciting agent. In the numerous cases of eyes enucleated on prophylactic grounds, where the other eye had not yet become involved, the "typical" findings of Fuchs have been confirmed only three times, but it is impossible to assume that only those three eyes were sympathetic and thus justifiably enucleated. According to my views the development of the "typical finding" occurs through a simple fibrous, plastic inflammation simultaneously with the migration of certain germs, and is, as a rule, completed when the second eye has been reached by the microbes. At times, even after seizure of the second eye by sympathetic ophthalmia, we may find the early stage still existing, which may be accounted for by an exceedingly rapid migration. The opposite, that is, "typical finding" without sympathetic ophthalmia, forces us to the assumption that the migration here met with effectual obstacles. The question now arises, why, in so many prophylactically enucleated eyes in which the "typical finding" was absent, an involvement of the second eye did not follow. Is it probable that all the bacteria were removed with the bulb?

Under no circumstances do I believe this. The salutary effect of the enucleation does not depend alone upon the removal of the diseased parts of the eye and the microorganisms existing in it. The opening of the lymph channels of the bulb and the orbit causes an accelerated flow away from the brain. It would seem indeed plausible, that because of this vigorous lymph drainage, just as in the sudden opening of the anterior chamber, serum products and bactericidal substances would pass from the vessels into this fluid. Thus the bacteria which had already entered the channels of the optic nerve would, because of the enucleation, not only be carried away by the lymph stream, but would also be attacked *in situ*.

With the exception of a few cases of sympathetic ophthalmia following sarcoma of the choroid, there has always been an opening of the eyeball of the first eye; to this category belong also the subconjunctival ruptures of the bulb. We always find in the sympathizing eye a chronic uveitis, which must be classed with the infectious granulomata. Once the onset of the inflammation has begun in the second eye, it will continue its own course regardless of and uninfluenced by the severity of the process in the first eye, or by its enucleation. During the course of sympathetic ophthalmia, relapses occur frequently. All these signs force upon us the assumption that a microbic and perhaps a specific exciter exists. Such exciter has not yet been successfully demonstrated either by staining or by cultural means.

I desire now to give a brief report of my own labors on this topic, which are published complete in *v. Graefe's Arch. für Ophthalmie*, Bd. 78, 79, 81. I have succeeded in producing genuine sympathetic ophthalmia both in monkeys and rabbits by infecting them with particles of the uveal structure taken from sympathetic human eyes, as well as from those strongly suspected of this disease. Other animals were inoculated with particles taken from the first and second eye, as well as the optic nerves of these diseased animals, with positive results. Of nineteen animals experimented on, two became generally diseased so that these are excluded from consideration. Of the remaining seventeen, the inflammatory changes were in only two cases confined to the inoculated eye. In thirteen cases the optic nerve of the first eye and the meninges were involved; in ten the optic nerve of the first eye,

the meninges and the nerve of the second; and in eight both nerves and the second eye, the meninges being also involved in seven of the latter.

The eyes of the inoculated animals reacted with varying degrees of severity, some with a mild and others with a severe iritis; some with uveitis, while one developed into phthisis bulbi. The disease of the second eye was not always confirmed with the ophthalmoscope, but was discovered in some cases by the anatomic examination. The intervals were 13, 78, 45, 17 and 27 days. The animals presented no general symptoms, and upon postmortem examination the blood in the heart was found to be sterile. (Two animals which gave positive blood test are not included here.)

The microscopic findings consisted of infiltration of the uvea with plasma cells usually arranged in circumscribed foci, at times more marked in the iris, again in the ciliary body, and at other times in the choroid. Occasionally epithelioid cells were discovered. In a large number of animals I found extra-bulbar granulations of considerable size in the subconjunctival and orbital tissues. In the center of these foci were found numerous epithelioid cells. The changes in the sheaths of the optic nerves presented no specific appearances; besides the endothelial proliferations there existed agglutinations and adhesions of the intervaginal spaces as well as exudates of mononuclear cells, and in two cases giant cells were found. In fourteen cases I was able to find a leptomeningitis. The site of the lesion varied; at times the base and again the convexity of the brain was affected; at all times I found parts of the meninges unaffected, which proves that the invasion originated in circumscribed areas and foci. The process itself was in the different cases variously intensely marked, and expressed itself by endothelial proliferation in the arachnoid, infiltration of round and plasma cells, which at times caused an exudate into the subarachnoidal space, new vascular formation with tendency to ecchymosis beneath the arachnoid, and in one case polynuclear leucocytes and giant cells. It would seem then that it is, generally speaking, a chronic, circumscribed meningitis, the microscopic picture of which resembles in some respects paralytic meningitis.

In each of the eight animals in which the second eye became also diseased, the inflammation passed from the first

eye through the optic nerve by way of the optic chiasm into the second eye. The passing of the inflammatory process from the eye into the optic nerve, and vice versa, presented two separate types; either direct from the choroid into the intervaginal space, or through the anterior ciliary vessels, out of the bulb, around it, through the musculature, and behind the eye into the optic sheaths. In some cases both types of transmission were observed.

In several cases I succeeded in finding microscopically the existence of a few Gram-positive diplococci in the choroidal infiltration. This observation is not of high import, in view of the fact that the factor of a mixed infection of the first eye cannot well be disputed. Of the four cases of sympathetic ophthalmia which have been reported to date, in which both optic nerves were examined, I have in my possession specimens from the patients of R. Deutschmann³ and Grunert.⁴ In each case diplococci were discovered in both optic sheaths and in the second eye. In my experiment animals, where the inflammatory changes extended beyond the first eye, Gram-positive diplococci were almost always discovered in the diseased optic sheaths and meninges, and at times even in the second eye. A mixed infection cannot be claimed here, because the migration into the optic sheath and the production of circumscribed chronic thickenings of the meninges belong to the specific characteristics of an hypothetic microorganism. However, I am not prepared to state, in view of this, that the cause of sympathetic ophthalmia is a Gram-positive diplococcus.

I succeeded once in growing culturally Gram-positive cocci from the aqueous humor taken from a sympathetic eye, which in appearance stood between virulent staphylococci and sarcinæ, and which assumed the form of diplococci when introduced into the animal body. When the vitreous body of a rabbit was infected with this culture it caused an abscess in the vitreous and iridochoroiditis, which presented after two months new infiltrations of the choroid, and led to chronic inflammatory changes in the optic sheaths and meninges.

I succeeded in growing Gram-positive and Gram-negative sarcinæ from a sympathetic eye, also a cocci culture which in the third generation changed into sarcinæ.

In my experiment animals I succeeded in producing sarcinæ in one case from the optic chiasm and in another from the optic nerve of the second eye.

I succeeded thereafter in several cases, where microscopic diplococci existed, in cultivating sarcinæ. On the subject of pathogenic sarcinæ, we find reports in literature, and Cao³ describes how to grow pathogenic air sarcinæ. In my own attempts I employed a typical yellow sarcina which makes well formed clumps and conglomerates, which does not coagulate milk or plasma from the horse, does not cause a destruction of the red corpuscles in blood bouillon, and which turns litmus whey slightly red. By injecting a pure culture into the peritoneal cavity of a guinea pig, and by recovering the product as late as possible, I procured a culture from the fifth animal with the following properties: In each productive area of fertile growth may be seen small white colonies, in some instances appearing as late as the second day. Bouillon assumes a diffused cloudiness, gelatin becomes slowly liquefied, and milk and horse plasma do not coagulate. Slight hemolysis of blood bouillon occurred on the third day. Upon microscopic investigation, diplococci were discovered in the hanging drop, which had the tendency to form into short chains or small clumps, though frequently existing singly. Tetrad formations did not reappear during two months' culture experiment in bouillon. In preparations procured from definite culture areas, stained with methylene blue, far more regular arrangements of the cocci are observed, as well as some unstained specimens in the microscopic field. The virulence in regard to the eye was not increased, but in the two rabbits inoculated with this culture there was observed endothelial proliferation in the optic sheaths, and in one case also in the meninges. This leptomeningitis resembles that which I caused by inoculation with the sympathetic uvea. From the chiasm of these animals the same diplococci were grown in one case, and in another, virulent pyogenic staphylococci.

As the starting point of a similar series, I chose another typical sarcina, with which I infected the vitreous of rabbits, and from these started new cultures, with which I inoculated other cases. The result of this series of investigations was as follows: By means of passing them through the rabbit's eye it was possible to transform the yellow sarcinæ into diplococci albi, which in one or another cultural property (milk coagulation, hemolysis), approached the true staphylococci. The virulence of the action upon the eye

was perhaps somewhat heightened; at any rate, the last two infected animals developed the severest cases of iritis, and in one of these the nourishment of the lens was so affected that a cataract resulted.

Since in both of these series we derived other bacteria from the eyes than those with which the eyes had been inoculated, it now devolves upon us to prove that the latter cultures are related to the former. Consequently I immunized a rabbit with a typical sarcina for the purpose of making a complementary experiment in connection with the various types which I obtained during the different stages of increasing virulence in both series. A checking of the hemolytic process, of varying degree, occurred in all the cultures. Since similar complementary control experiments with chosen sarcinæ and with virulent and nonvirulent staphylococci have been made with fully negative results by Altmann and Bluhdorn,⁶ I could have dispensed with my own control experiments.

I may accordingly assume that in cases of perforation of the eye, sarcinæ are carried into the eye directly by the inflicting instrument, or later find their way through the wound into the eye from the conjunctival sac, and there change in such a manner as to enable them in the form of diplococci to pass from the first eye, by way of the lymph channels of the optic nerve, past the chiasma, into the second optic nerve and thence into the second eye, setting up a sympathetic ophthalmia.

The theory of Leber and Deutschmann, holding that the transmission of the exciting agent of sympathetic ophthalmia occurs by way of the optic nerve sheaths, receives by means of my researches, a renewed and assured experimental and clinical support. The former difficulties of this theory, which consisted in the facts that the attack affected the anterior portion of the eye, as well as the frequent absence of symptoms of meningitis, are removed by the anatomic demonstration of a chronic, circumscribed leptomeningitis in seven out of eight animals afflicted with sympathetic ophthalmia, as well as by the extraocular transmission of the inflammatory process from the optic nerve to ciliary body.

I must now briefly consider the antibacterial theories. Golowin⁷ contended that in injury of the eye, especially in lesions of the ciliary body, under certain conditions poisons

(autocytotoxin) are generated, which enter the blood circulation and in this manner reach the other eye. Also that these poisons had a specific influence upon the cell protoplasm of the iris and ciliary body, thereby effecting a change in these tissues. These then would be the conditions necessary to establish a sympathetic ophthalmia. Weichardt and Kummel⁸ imagine that through the resorption of disorganized substances from the diseased uvea of the one eye antibodies are generated which have a deleterious effect upon the other eye. But we have so far no proof that the generated antibodies, which can be produced by serologic methods in animal experiments, are capable of inciting an inflammation and that they at all exist in the serum of sympathetic eyes.

The anaphylactic theory is to-day chiefly represented by Elschnig.⁹ The sensitizing, according to his opinion, is effected by means of the eye pigment which is set free by the injury and is then resorbed. The inciting of the anaphylactic inflammation is supposed to depend upon an existing somatic anomaly, requiring the destruction of only a single uveal cell to give to this intense disease process its inception. Since, however, patients with sympathetic ophthalmia seldom suffer with general disturbance, it is Elschnig's opinion that it is a matter of autointoxication or a disturbance of metabolism in the alimentary canal, which could be occasionally diagnosticated by the presence of indican in the urine. In refutation of this theory E. v. Hippel¹⁰ has already expressed himself fully. I also deem it impossible that the pigment of one uveal cell should be sufficient to bring on an anaphylactic inflammation. Since the toxic substances are a product derived from the broken down pigment after this latter has been resorbed, it would seem that a greater quantity would be required, which would demand a more extensive inflammation to liberate them. If a somatic anomaly can produce this severe inflammation, we need not resort to anaphylaxis for explanation, and we no longer would deal with a sympathetic, but with an idiopathic inflammation. Guillery¹¹ by means of enzymes, ferments and other substances that exert kindred characteristic action upon the eye of the rabbit and especially upon the uvea, succeeded in producing a round cell infiltration, corresponding in the main with the infiltration of sympathetic ophthalmia. But I cannot recognize this similarity, since, as formerly explained,

I do not admit that there is an absolutely specific anatomic picture of sympathetic ophthalmia. Furthermore, there is in his investigations a plain lack of proof that the inflammation caused by the ferments can be continued for a long time without the renewed support of ferments, and that the propagation power is of sufficient degree to carry the process to the second eye.

The results of my experiments and investigations on the pathogenesis of sympathetic ophthalmia may be summed up as follows:

1. I have succeeded by inoculation with particles taken from the choroid of a human eye diseased with sympathetic ophthalmia, in producing genuine sympathetic ophthalmia in monkeys and rabbits.

2. I assert that the exciting cause of sympathetic ophthalmia is a Gram-positive diplococcus; perhaps a modified *sarcina*.

3. The second eye becomes diseased when the bacteria succeed in passing from the first eye into the lymph channels of the first optic nerve, past the optic chiasma, through the lymph spaces of the second nerve into the orbit.

4. The course of the bacteria passing from the eye into the optic lymph spaces, and vice versa, is a twofold one; either direct from the choroid into the intervaginal space, or along the anterior ciliary vessels from the eyeball, around it, within the musculature of the orbit, and eventually back of the eye along the central vessels into the spaces of the optic nerve, and vice versa.

5. The chronic inflammatory changes in the meninges consist of circumscribed foci and cause no general symptoms.

LITERATURE.

1. v. Graefe's Arch. f. Ophth., LXXVII.
2. v. Graefe's Arch. f. Ophthalm., LXI. and LXX.
3. Beiträge zur Augenheilkunde, Heft 10, 1893.
4. Klinische Monatsblätter f. Augenheilkunde, 1900, Beilage.
5. Centralbl. f. Bakteriöl., Bd. LVII.
6. Centralbl. f. Bacteriol., Bd. LVII.
7. Klinische Monatsblätt. f. Augenheilk., 1909, I.
8. Münch. medicin. Wochenschr., 1911, No. 32.
9. v. Graefe Arch. f. Ophthal., Vol. 75, 76, 78, 79.
10. v. Graefe Arch. f. Ophth., Vol. 79.
11. Knapp's Arch. f. Augenheilk., Vol. 68. Klinische Monatsbl. f. Augenheilk., Vol. 49.

XX.

CONGENITAL ABSENCE OF BOTH LOWER PUNCTA —LIFELONG (DOUBLE) DACRYOCYSTITIS— APPARENT CURE FROM DACRYOCYSTO- RHINOSTOMY.*

W. H. LUEDDE, M. D.,

ST. LOUIS.

Congenital absence of the puncta and canaliculi is rather a rare occurrence. It is much less frequent than the presence of multiple or unusual openings or duplication of the canal. (Kalt, *Encyclopedie Francaise d'Ophthalmologie*.) It may be present where there are other serious embryonic disturbances involving the orbit. Where conditions are otherwise normal, I have found it recorded only three times outside of the case here presented. Magnus reports two of these. In each of his cases the defect involved the lower punctum, right and left. (*Klin. Monatsblätter f. Augenheilk.*, Bd. V, 2, p. 299, and *Centralbl. f. Augenh.*, Bd. IV, p. 119, 1880). In Emmert's case (*Arch. f. Augenh.*, Bd. V, II, p. 399, 1875) all four puncta were absent. These cases where there is lacking all trace of the punctum and its tubercle differ from the cases of atresia or imperforate punctum in the fact that there exists in the latter a perfectly patulous canaliculus.

Zehender (*Klin. Monatsbl. f. Augenheilk.*, 1883) and Lafite-Dupont (*Société d'Anatomic et de Physiologie de Bordeaux*, March, 1895) have reported the only cases I found recorded of atresia of the punctum. Simple incision of the membranous obstruction and passage of probe results in a cure of these cases. Nothing was accomplished in the cases where there was total absence of the punctum, as in our case.

Some months ago I did make and try to maintain an artificial passage in our case from the inner angle of the right

*Read before the Ophthalmic Section of the St. Louis Medical Society, January 3, 1912.

lower lid to the lacrimal sac. I hardly expected it to remain open, but as long as the case could be kept under observation there was no good reason not to make the effort. The result was entirely negative. There remains only a small scar on the right lower lid to bear witness to the attempt to put a canal where nature had not produced it in the usual manner.

The inner angle of the left lower lid has not been modified in any way. There you find the utter absence of any landmark or sign of a punctum lacrimale.

In trying to open the passage on the right side no sign of a patulous canaliculus was discovered, but, as von Hippel points out (Graefe-Saemisch, *Handbuch d. Augenheilkunde*, second edition), it is difficult to prove the absence of the canaliculus.

Van Duyse (*Encyclopedie Francaise d'Ophtalmologie*) explains that the absence of the punctum is probably due to the failure of the formation of a canal in the epithelial bud, from which the canaliculus and punctum normally develop. Thus the canaliculus is absent when the punctum is not developed, the formation of the canal beginning at the punctum.

It is significant that of the total of four cases, three show involvement of the lower puncta only, all bilateral, and only one in which the upper were involved as well; none in which the upper puncta were alone involved. Stanculeanu (*Arch. d'Ophtal.*, March, 1900) who examined a series of human embryos beginning at one month, found in one of them that both upper canaliculi only were open, indicating that such may be the regular order of development.

Another reason in addition to its rarity which induced me to present this case will be brought out in the clinical history. It points to the danger that lurks in chronic inflammatory conditions in the lacrimal sac, namely, the infection of the eye itself after some injury. It is superfluous to utter such a warning to the members of this Ophthalmic Section, but it is often difficult to impress the laity and even the general practitioner with this fact without a concrete example.

T. G., male, aged 23 years, was brought to my office October 3, 1910, on account of an injury to his left eye. Examination showed a vertical cut in the cornea, about six mm. long, slightly to the nasal side. Iris prolapsed into the wound. The anterior chamber contained fibrin and pus. Symptoms of be-

ginning panophthalmitis were present. Vision was reduced to the doubtful recognition of fingers at one foot. Patient refused to have X-ray photograph made to determine the presence of a foreign body in the eye. He was certain there was not. Exposure to giant magnet was without result, thus partially excluding the presence of an iron fragment. General aggravation of all symptoms of panophthalmitis led to the enucleation two days later. Examination of the globe failed to show a foreign body. Smears of pus from the vitreous showed what resembled a pure culture of pneumococci, similar in every way to smears from the discharge from the lacrimal sac. Copious mucopurulent discharge was present at all times on pressure over the lacrimal sac on both sides. No evidence of a punctum was present on either lower lid. The normal elevation for the punctum was absent. According to the patient, double dacryocystitis had existed as long as he could remember. Treatment was begun at once to correct this condition, which may have been responsible for the previous infection and loss of the left eye. The patient was made fully aware of the danger to the remaining eye from this source. In fact, he has several faint nebulosities, the result of superficial ulceration some years ago of the cornea of the right eye, indicating previous infection. Mild measures, such as irrigation of the lacrimal sac and probing, were followed by partial relief. Dr. W. M. C. Bryan, who will report in full on the nasal operation done in this case, finally succeeded in establishing such perfect drainage that to all appearances a cure has been effected.

Dacryocystorhinostomy, as this last operation has been designated by Fuchs, is again resorted to, because the sacrifice of all nasal drainage from the conjunctival sac by the extirpation of the lacrimal sac is not a satisfactory condition of affairs. If it proves to be an efficient and reasonably permanent substitute, it will no doubt become deservedly popular in those cases of chronic dacryocystitis which resist ordinary treatment. Similar attempts were made more than a century ago and were later abandoned. Modifications of recent date may be sufficient to overcome the defects which defeated its usefulness before.

Permanency in its effect is regarded as doubtful. It would appear that this could be secured by the removal of quite a

large section of the bony wall and by the use of a flap of mucous membrane to cover the defect and prevent a contracting cicatrix at this point. All this is brought out by Dr. Bryan.

Of greater importance to the ophthalmologist is the question of infection of the eye from the nasal cavity after such an operation. We must remember in this connection that the normal patulous lacrimal canal is by no means a germ proof arrangement, even if there is a fold of mucous membrane at the lower orifice through which the canal enters the nose somewhat obliquely. Favorable conditions for the propagation upwards of germs from the nose to the conjunctival sac exist normally, such as warmth, darkness, and moisture. Except under unusual conditions, however, we do not have this extension upwards, and when it does occur, free nasal drainage is one of the principal means of relief. Therefore, it does not appear to be dangerous that a free communication should exist between the two mucous surfaces.

If for any reason it becomes desirable to suspend the communication between the nasal cavity and the eye, it is a simple matter to obliterate or close the punctum and then restore it after the necessity which made it desirable to close it has passed away.

From my experience and observation I would make this operation of Dr. Bryan the operation of choice after simple probing and drainage fail, in preference to actual extirpation of the lacrimal drainage system.

XXI.

SUBMUCOUS DACRYOCYSTORHINOSTOMY FOR PERSISTENT DACRYOCYSTITIS.*

W. M. C. BRYAN, M. D.,

ST. LOUIS.

Since symptoms of disturbance in the lacrimal apparatus manifest themselves in the eye, it is to the ophthalmologist that these conditions are usually referred for treatment. However, as the nasal duct lies entirely in the lateral wall of the nose, it is not surprising that the etiologic factor of the lacrimal trouble may be intranasal and that at times corrective measures may be applied best by that route.

In the case about to be reported the etiology was not nasal, but its relief required intranasal interference.

The patient, T. G., was referred to me October 28, 1910, by Dr. W. H. Luedde, who asked my cooperation in the effort to establish proper lacrimal drainage. There was a complete absence of both inferior puncta and double purulent dacryocystitis, which had existed since childhood, according to the patient's statement. The left eye was artificial, the original having been lost as a result of an infective panophthalmitis following injury. This has been described by Dr. Luedde. Nasal examination disclosed a low anterior septal spur to the left, encroaching upon the anterior end of the inferior turbinate, and a high septal deflection to the right. A moderate hypertrophy of the right inferior turbinate filled the inferior meatus. The search for the inferior ends of the lacrimal probes under the inferior turbinates was finally rewarded when they were found ending blindly beneath the turbinal mucosa, not free in the subturbinal space. In order to obtain access to the left nostril the spur was removed, and later, to relieve pressure headaches, the anterior end of the right mid-

*Read before the Ophthalmic Section of the St. Louis Medical Society, January 3, 1912.

dle turbinate was removed. The anterior ends of both inferior turbinates were removed in the course of the next two weeks, and after some subsequent treatment lacrimal sounds could be freely passed. About two months later, as Dr. Luedde found it still impossible to wash through it, the left duct was opened into the middle meatus. Both ducts then allowed the free passage of probe and fluid. Notwithstanding this fact, both sacs continued to fill up with pus, in spite of persistent attention, until on December 6, 1911, it was decided that a dacryocystostomy should be done.

Operation.—Owing to a prominence of the lateral nasal wall just anterior to the nasal side of the median wall of the saccus lacrimalis, which prominence is frequently present, a clear view of the exact site of the operation was not immediately possible, and to overcome that difficulty a submucous operation was devised. A vertical incision was made through the mucous membrane just anterior to the prominence mentioned, and the mucous membrane was elevated from the underlying bone to a line just behind the region of the fossa sacci lacrimalis, or just in front of the anterior end of the attachment of the middle turbinate and extending up to the height corresponding to the level of the lacrimal sac determined externally. The mucous membrane thus elevated was cut free above and posteriorly and turned down out of the way over the inferior turbinate. The bony wall was freely exposed to view, and under the guidance of the eye the median wall of the fossa sacci lacrimalis was removed by sharp curettes and punch forceps. On breaking through the bony wall, the sound, which had been passed previously, moved and gave the assurance that the fossa had been entered. After the removal of the bone, the membranous wall was cut away and several drops of pus were evacuated. The upper posterior angle of the mucous flap was removed to correspond to the opening made and the rest replaced and packed into position. Healing was prompt, with almost immediate freedom from the suppuration which had lasted so long.

December 15th the left saccus was opened, but not submucously, because the duct had been opened previously to within one-half centimeter of the saccus. The remaining portion of the duct was merely opened up by a sharp hook and the opening carried into the sac and all fragments and tags

cleaned up. Healing was not so prompt as on the other side. Both operations were performed under cocain adrenalin anesthesia with the guide of a lacrimal probe in position.

Efforts to relieve persistent dacryostitis by establishing nasal drainage were made as early as the beginning of the eighteenth century. The establishment of a new path from the saccus into the nose had some vogue from 1840 to 1860, and then fell into oblivion until reintroduced by Auboret in France in 1904, and Toti in Italy in 1906, and later by Lagrange. These gentlemen, however, attacked the operation from without, with the necessary resulting scar and much of the difficulty of the extirpation operation. Intranasal methods have been reported by Caldwell, Killian and Passow, but all are alike in that they sacrifice the anterior end of the inferior turbinate.

In 1907 Dr. Luedde reported a case in which callus subsequent to a fracture of the nose completely blocked the duct. A forcible attempt to pass a probe resulted in making an opening into the middle meatus, with the result that good drainage into the nose was established and an external fistula of long standing healed spontaneously.

West, in 1910, reported an operation before the American Ophthalmological Society, which he called "A Window Resection of the Nasal Duct in Cases of Stenosis." "The operation consists in resecting under local anesthesia, adrenalin and cocain, a window from the nasal duct in the upper part of the nose above the inferior turbinate, and involves the removal of a part of the lacrimal bone and also a piece from the superior maxilla." The operation reported in this paper is a modification of West's procedure.

LITERATURE.

Ency. Franc. d'Ophtal., Vol. VIII, p. 319.

Lagrange and Aubaret: Traitement des dacryocystitis par la creation d'une voie nouvelle a l'unguis. Ann. d'Ocul., September, 1907.

West: A window resection of the nasal duct in cases of stenosis. Trans. Am. Ophth. Society, 1910, p. 654.

ABSTRACTS FROM ENGLISH OPHTHALMIC
LITERATURE.

(UNITED STATES OF AMERICA.)

BY

MATTHIAS LANCKTON FOSTER, M. D.,

NEW ROCHELLE.

HAROLD G. GOLDBERG, M. D.,

PHILADELPHIA.

OSCAR WILKINSON, M. D.,

WASHINGTON.

AND

ARTHUR F. AMADON, M. D.,

BOSTON.

An Unusual Case of Epibulbar Sarcoma.

VERHOEFF, F. H. (*Archives of Ophthalmology*, March, 1912), remarks that histologically the tumor did not differ in structure from a melanotic spindle-cell sarcoma of the choroid, and its origin was no doubt similar—that is, from chromatophores of the corneal limbus. The duration of the case, eleven years, was apparently longer than the average duration of fatal cases of choroidal sarcomata, but it must be remembered that the latter are usually not observed until they are of considerable size. In 1903, after an analysis of most of the previously reported cases, R. G. Loring and the writer arrived at the conclusion that the view then prevailing as to the benignancy of epibulbar sarcomata was erroneous, and that they were, in fact, so highly malignant that enucleation should be resorted

to as soon as the diagnosis was certain. The correctness of this conclusion seems to be exemplified by the present case. As a visual demonstration to patients of the urgency of early operation, he presents illustrations, which he believes should prove most useful. In view of the large size of this tumor, which is one of the largest, if not the largest, of its kind reported, it forms a striking illustration of the fact that epibulbar sarcomata have almost no tendency to invade the globe. In the literature there are only about five cases, including one examined by the writer, in which it is highly probable that an epibulbar sarcoma invaded the interior of the eye, and even in these the possibility of an intraocular origin of the growths cannot be absolutely excluded. H. G. G.

A Simplified Method of Extirpation of the Lacrimal Sac.

BARCK, C. (*Archives of Ophthalmology*, March, 1912), modifies the incision by making it more mesial so that it can be started higher without injuring the ligament. The dissection of the sac commences with its detachment from the bone, and for this purpose he uses two small periosteal elevators, finally encircling the sac with a curved hook dividing the tissues without cutting. He claims for this the old principle that a surgeon will never divide the adhesions or vessels of a growth in the dark, but will first pull them out, as in this method. H. G. G.

A New Method of Making Film Preparations to Demonstrate the Presence of the Gonococcus.

McKEE, HANFORD, Montreal (*Ophthalmic Record*, January, 1912), commenting on the important place the gonococcus has in ophthalmia neonatorum, refers to the difficulty of demonstrating this diplococcus, and remarks that he has been of the opinion that the methods employed are insufficient. He reports that examination on a film of epithelial cells taken from a gonorrheal patient showed masses of organisms identical in morphology with the gonococci that were found within them, the cytoplasm in many cells being completely filled. Pus taken from two cases of ophthalmia neonatorum examined in the usual way gave negative results. Films were then prepared, as used in trachoma cases, for examination of the epithelial cells. The palpebral conjunctiva was then gently

stroked and the material spread on a glass slide. This was dried in the air and fixed in eighty per cent alcohol for ten minutes, then stained with Giemsa solution, one in twenty parts of distilled water, for twenty minutes. In each case the epithelial cells were crowded with biscuit shaped diplococci. Hemoglobin agar inoculated with the discharge containing epithelial cells gave a profuse growth of the gonococcus.

O. W.

The Operation of Excision of Tarsus and Conjunctiva (Heisrath) in Old Trachoma, Together with Demonstration of a New Instrument, and a Description of a New Method of Performing It.

CLAIBORNE, J. HERBERT, New York City (*Transactions of the American Ophthalmological Society*, 1911; *Archives of Ophthalmology*, March, 1912), states that expression has been considered as indicated in the florid stage of trachoma, but that in the later or cicatrized state the results have been disappointing. In this latter class of cases the radical operation of removal of the tarsus with its overlying conjunctiva gives good results. One case is reported at some length and several are referred to, in all of which remarkable results were obtained. In general terms it may be asserted that if expression fails and the tissues have become cicatricial, this combined operation is indicated, and with promise of satisfactory results. A special clamp has been devised, which is a modification of Desmarre's. This is slipped under the lid up to the supra-orbital ridge, clamped and reversed, and laid over the brow. The conjunctival surface is thus exposed, and a continuous section is made around the upper edge of the tarsus, terminating at each end near the edge of the lid. As the cut is made through the conjunctiva and tarsus the tarsus springs away from the underlying tissue and is dissected away to the fornix and well loosened to gain slack and to relieve the pull when the conjunctiva is sewed to the lid. Three sutures are used, each with a needle at both ends. The dissected tarsus and adherent conjunctiva are lifted away by the forceps, and the middle suture is inserted, first one needle and then the other being passed through the fornix conjunctivæ from the conjunctival surface just below the limit of the tarsus, the stitches being parallel to the edge of the section. Each lateral suture is inserted in the same way. The tarsus is now cut away, the clamp removed, the center of the lid is grasped

by a pair of conjunctival forceps, the needles of the middle suture are passed through the cutaneous surface, emerging on the skin 4 or 5 mm. above the ciliary border of the lid, then the lateral sutures are passed in the same way and each is tied over a small roll of cotton. The operation is rapid, almost bloodless, definitely outlined, the hands of the operator alone are around the eye and satisfactory results usually follow, the writer being confident that without the tarsus the granulations are practically innocuous.

A. F. A.

Keratoconus—Report of a Case.

LEFEVER, C. W., Philadelphia (*Ophthalmic Record*, February, 1912), reports the case of a man, 50 years old, whose sight had been good until he was thirty years of age, when he began to wear glasses, but he could see fairly well without them until forty, when his vision became very poor. When seen in July, 1907, he gave a history of many changes of glasses dating back to 1899. His vision with correction was, in the right eye, 20/40, which could not be improved. Correction in the left was + 2.00 sph. = 12.00 cyl. ax. 100. With + 3.50 sph. added for near work he was able to act as timekeeper at a boxing ring, in which capacity he was obliged to see the second hand of his watch. Vision without glasses amounted to counting fingers at thirty inches. He found that vision was greatly improved if the glasses were tilted with the tops towards the brow, so that he could look obliquely through the lens. Thinking that this was due to the prismatic effect, the writer attempted to get the same result by using prisms, but failed; however, a correction given a year later gave him vision of 20/20 in the left eye, and he no longer desired to tilt the lens. With the exception of the conus, which occupied a lower site than usual, there were no visible changes in the eyes. The distended area of the cornea resembled a hanging drop of viscid liquid, the greatest projection being below the center of the cornea. The grinding of the lens for the left eye required a special tool to be made.

O. W.

Dystrophia Epithelialis Corneæ (Fuchs), with Report of a Case.

KNAPP, ARNOLD, New York City (*Transactions of the American Ophthalmological Society*, 1911), reports a case which illustrates the differential points between dystrophia of

the cornea and senile sclerosis of the cornea. After a cataract extraction upon a woman of 82 years, which progressed satisfactorily otherwise, the cornea became anesthetic, showed a faint superficial opacity, and its surface became uneven and finally stippled. The tension was normal. Treatment was of no avail and there was practically no change in the appearance of the eye until her death, a few months later. The other cornea had been in the same condition during the period of observation and perhaps from the time of a previous operation twelve years before. This condition is peculiar to old age. The opacity increases slowly, is generally more pronounced in the pupillary area, and finally newly formed tissue is deposited in the cornea between Bowman's membrane and the epithelium. In senile sclerosis the corneal opacity is deeper in the cornea and the superficial changes are absent.

A. F. A.

On the Management of Nonclosure of Cataract-Operation Wounds.

GIFFORD, H., Omaha (*Ophthalmic Record*, January, 1912), mentions a "very effective measure" which he learned from Professor Horner of Zürich, as a remedy for nonclosure of the wound after cataract expression. The lids are left untouched by any dressing; the eye is covered with a pasteboard shield as a protection from external violence, and the wound closes promptly. He says that of 750 expressions and 50 extractions of senile cataract he has had from 25 to 50 cases in which the wound was not closed by the fourth or fifth day. These were treated by keeping a moist dressing on the good eye to keep it still, while the lids of the eye operated on were left free from pressure and protected by a pasteboard shield. In all cases the wound closed permanently in from one to three days after the cotton was left off. There has been no necessity for reopening and scraping the edges of the wound, searching for capsule fragments, sliding over a conjunctival flap, cauterization of the wound, etc. In conclusion, the author remarks that holding the lids quiet with a strip of plaster or with a skin stitch would be a good plan.

O. W.

Some Questions Concerning the Method of Development and the Pathology of the Retinitis of Bright's Disease.

SEMPLE, N. M., St. Louis (*Transactions of the American Ophthalmological Society*, 1911), discusses a case which

throws some light upon the controverted question of the method of development of that form of retinitis which is classified as the retinitis of Bright's disease. Uncertainty appears in regard to the changes in the kidney, as, for example, in the diseased kidney of pregnancy; it has not been settled whether they are chiefly degenerative or partly degenerative and partly inflammatory. As far as pathologic investigation has been able to demonstrate, the condition of the kidney occurring during pregnancy is of the acute diffuse or parenchymatous type, with rapid degenerative changes. The etiologic factor has not been definitely demonstrated. The most generally accepted theory is that of a severe toxemia, due to a grave disturbance of metabolism and elimination during the course of gestation. The kidney or the liver or the retina may bear the brunt of the attack, in certain cases the kidney escaping entirely, and many times the affected organ recovering rapidly after an early abortion. The case under consideration illustrates this. The patient, aged 28, four years previously had undergone an attack of retinitis during her first pregnancy, which resulted in the complete loss of vision of her left eye. Two subsequent pregnancies had gone to full term without retinal complication. But during her fourth pregnancy the vision of her right eye began to fail early and proceeded rapidly to light perception only. The entire central portion of the retina showed extensive involvement. An intense edema, with large areas of exudation, showed the characteristic white appearance, and fringed by numerous hemorrhages, completely surrounded the disc, extending well beyond the macula. The other eye showed large atrophic spots bordered by heavy pigmentation, in the neighborhood of which areas of active inflammation could be seen. Artificial delivery of a full term child was immediately performed. The inflammatory condition of the retina promptly began to subside, but without improvement in vision. Repeated examination of the urine failed to show any involvement of the kidney. There seems to be no essential difference between the retinitis of pregnancy and that from other forms of Bright's disease, except the rapidity and intensity of the former, due probably to the increased virulence of the toxins in the blood. Immediate emptying of the uterus allows the active retinal inflammation to subside and the exudate to absorb before any destruction of retinal tissue, with deposits of hyalin. The pathologic

changes in this case, as in three others reported in 1908, are essentially alike. They all represent such changes as take place in cases of comparatively short duration. Corresponding to the white areas as seen with the ophthalmoscope, were found masses of exudate confined chiefly to the outer reticular layer, but occasionally extending even to the external limiting membrane. The reaction of these masses to different stains gives a definite picture of fibrin in various stages of metamorphosis into hyalin. The retinal tissue itself is left practically intact. There were no traces of fat or of fatty degeneration of the supporting fibers of Mueller, in marked contrast to the findings of Leber. The changes described by him occurred in cases of longer duration. The changed ganglion cells of the ganglion cell layer are to be seen in those sections showing the most extensive involvement of the retina generally, and also there are found large deposits of fibrin and hyalin. They are in masses. The hyalin is evidently derived from the colorless elements of the blood and certain migratory cells. At first they appear swollen; in the more advanced stage they have lost their normal position and are found in the nerve fiber layer, are greatly swollen, losing all characteristics of the normal ganglion cells except that they retain a very noticeable similarity in shape to these cells. With the combined cosin-hematoxylin stain the central body, representing the nucleus, stains an intense red, while the surrounding cell substance is tinged a light red. How these cells are transferred to their position may be understood by remembering that the edema causes extravasation from the outer and inner plexuses of the small retinal vessels, which extravasation eventually forms the hyaline masses in the outer reticular layer. From the inner larger plexus the first effect of the edema is naturally on the adjacent ganglion cell layer, the cells being pushed into the nerve fiber layer, becoming soaked with the albuminous fluid, eventually undergoing the hyaline changes before mentioned. Also, inasmuch as there are cases of marked involvement of the retina in Bright's disease where the retinal and choroidal vessels are practically normal, we may conclude that the most reasonable explanation for the development of the disease in the retina is that the toxins of the blood act as the direct offending agent, and this before affecting the vessels to an extent histologically demonstrable.

A. F. A.

Central Guttate Choroiditis.

SHOEMAKER, W. A., St. Louis (*American Journal of Ophthalmology*, March, 1912), reports three cases of central guttate choroiditis met with in men aged 38, 57, and 53. The cause seemed to be arteriosclerosis in all three cases, and the lesion seemed to be inflammatory in character rather than degenerative.

M. L. F.

The Use of Serum in Sympathetic Ophthalmia.

DERBY, GEORGE S., Boston, AND PRATT, HORATIO N., Louisville (*Transactions American Ophthalmological Society*, 1911), report one case of sympathetic ophthalmia of twelve days' duration, becoming worse during the last two days. Serum was prepared from the blood of a patient convalescing from this disease, and at intervals of about ten days, determined by fresh aggravation of the conditions, three doses of 23, 30 and 20 cc. respectively were given, each dose followed by marked improvement in about two or three days, both in the inflammatory conditions and in the vision. The original source of the supply being no longer available, a dose of diphtheria serum was used once and blood serum twice, followed by improvement in each case. At the end of three and a half months the eye was free from inflammation and the vision was 20/30. Two months later the vision had risen to one letter in 20/20. Three other patients were similarly treated without benefit. The results in the first case came quickly, but seemed to be considerably limited as to duration of effect. This experiment seems to coincide with those reported by zur Nedden and Brons.

A. F. A.

A Report of Four Cases of Acute Disseminated Myelitis with Acute Retrobulbar Degeneration of the Optic Nerves.

HOLDEN, WARD A., New York City (*Transactions of the American Ophthalmological Society*, 1911), gives detailed and illustrated reports of four patients who had sensory disturbances in the trunk and limbs, with more or less complete retrobulbar paraplegia, two of whom died of respiratory paralysis while the other two still survive with the conditions still present. Retrobulbar neuritis was also present. Retrobulbar neuritis may accompany myelitis without being dependent upon it, the two having a common cause, viz., noxious matter circulating in

the blood, either bacteria or toxins. Foci of degeneration appear scattered throughout the spinal cord, and the entering vessels running to these foci are surrounded by cellular infiltrations. As in the present cases, unusual clinical pictures would be expected from such accidental distribution of foci. The conclusions reached by the study of these cases are that temporary or permanent blindness may follow rapidly and without immediate fundus changes, which may appear later as pallor of a part or all of the disc, with blurring of the edges; the veins may be tortuous, the arterial walls thickened. The changes in the field of vision are peculiar in three of the cases. In one there was excessive concentric contraction of the field with fair central vision, and in two there was hemianopsia for certain test objects for one eye only. In two of the cases there was degeneration of the gray matter of the cord and lateral columns. In the degenerated area the blood vessels and pial vessels were surrounded by cellular infiltration. Similar changes probably occurred in the affected optic nerves.

A. F. A.

Exophthalmos From a Bony Tumor Growing From the Nasal Wall of the Left Orbit.

POST, M. H., AND ALT, ADOLPH, St. Louis (*American Journal of Ophthalmology*, February, 1912), report a case in which a bony tumor, located about one-half inch back in the orbit and extending almost to the sphenoidal fissure, was removed together with all the contents of the orbit. It seemed to originate in the ethmoidal cells, and it carried before it part of the lacrimal bone and the lamina papyracea of the ethmoid. Involvement of the accessory sinuses had been clinically excluded.

Alt's examination of the tumor is interesting. He says: "It consisted of a somewhat curved, thin, bony plate with rounded edges, 27 mm. long, and at its greatest width 13 mm. wide, which represented the lamina papyracea of the ethmoid. On the nasal side and about at its middle a roundish, partly bony mass was attached, which was of the size of a small hazelnut. It was somewhat brownish. On section it was seen to consist of a number of cells varying in size and partly filled with a chocolate brown coagulated mass. No solid part was visible. Under the microscope the bony walls of the numerous cells showed nothing abnormal. Nowhere could any

signs of corrosion or of proliferation be found. In some sections the small quantity of marrow contained in the thicker parts of the bone was highly infiltrated, and in those of the ethmoidal side numerous nests of psammona bodies were found. The mucous membrane lining the cells was in a high state of inflammation. In places it was enormously thickened by hyperemia and cell infiltration, and formed microscopic polypi springing forth into the lumen of the cell; in some parts it was detached from the underlying bone, but this may have been an artefact. A number of mucous glands showed a considerable distention of their lumen. The epithelium was well preserved. The specimen did not show the presence of any malignant tumor and no signs of proliferation or bony growth. The only visible pathologic condition was the severe inflammation of the mucous membrane lining the cells.

M. L. F.

**A Report of a Case of Antral Disease in a Four-Months-Old Child,
With Marked Orbital Symptoms.**

(AUTHOR'S ABSTRACT.)

KRAUSS, FREDERICK (*Archives of Ophthalmology*, March, 1912), reports the following case:

The child's birth was normal. When the child was one month old it had a severe cold, but made an apparent recovery. One week before admission there was a recurrence of symptoms, with swelling of the eyelids and face.

On admission the temperature was 100° F. The left side of the face was greatly swollen, with much edema of the lids. The left eye was greatly proptosed, with ocular movements greatly restricted. Down and out in the orbit there was an appearance of tumor suggesting inflammatory origin. The nasal mucous membrane was much swollen, showing much pus, especially in the left nostril. Examination of the mouth showed mobility of the palatal plate of the superior maxillary bone. In the alveolar process of the superior maxilla on the left side, at about the site of the first bicuspid teeth, was a minute granulating spot which upon probing exuded pus rather freely. With but slight effort a grooved director was passed along the sinus to the sinus maxillaris, and upon enlarging the opening with a curette, the bent probe could be passed into the outer part of the orbit into the tumor then presenting.

Much free pus was evacuated. After making a counter opening into the nose, the cavity was washed freely with boric acid and packed with iodoform gauze.

In curetting the sinus two large, well developed teeth were brought forth. Each tooth measured approximately one-quarter of an inch in length and was quite hard.

Treatment consisted of daily washing of the sinus followed by packing with iodoform gauze. Later, on account of continued loss of weight and refusal of food, a packing wet with a weak bichlorid solution was substituted. The swelling rapidly disappeared. There was some exfoliation of small fragments of bone. No incision into the orbit was made until several weeks later, when a small sluggish abscess, which had remained, was opened, the drain being removed in two days.

Onodi has shown the presence of practically all of the sinuses in the first year, and has demonstrated that the antrum in the first year of life varies from 5 mm. to 19 mm. long, 3 mm. to 9 mm. high, and 3 mm. to 8 mm. broad.

Small Round Cell Myosarcoma of Orbit, with Extension Into Eyeball.

POSEY, W. CAMPBELL, Philadelphia (*Ophthalmic Record*, February, 1912), reports the case of a girl 15 years old, who first consulted the writer in January, 1910, on account of an unusual prominence of the right eye. History showed that at 14 months she had a considerable exophthalmus of the right eye, which disappeared in the course of some months without abscess formation or discharge of pus. Two months previous to coming under observation the prominence of the eyeball reappeared and the sight became more and more dimmed. Examination showed that the eye was driven directly forwards and that the movements of the globe were restricted. The apex of the orbital cavity appeared to be filled with solid material. Ophthalmoscopic examination showed the media to be clear and that there were signs of stasis in the papillomacular region. There was haze and swelling of the retina in the macula, tortuosity of the retinal vessels, and dilatation of the veins. Vision in the right eye, 3/60, in the left, 5/5. The progressive nature of the neoplasm and the exclusion of any sinus involvement indicated the necessity for operation. The orbit was opened by the method of Krönlein. After dis-

section of the tissues about the nerve a mass was felt below this structure which had no connection with the eyeball or optic nerve, but was imbedded in the tissues of the inferior portion of the orbit. The globe was enucleated and the greater part of the contents of the orbit eviscerated. Two gold balls had to be inserted, one on the floor and the other in the roof of the orbit, before an artificial eye could be held in position. The result of the examination of the mass removed from the orbit showed that it was a sarcoma of the endotheliomatous type.

O. W.

A Case of Retrobulbar Pneumococcic Abscess of the Right Orbit.

DUTROW, HOWARD V. (*Archives of Ophthalmology*, March, 1912), reports the case of a boy, age 14, who had an attack of lobar pneumonia six months before; eight days prior to admission the right eye became painful, followed a day later by a swelling of the lids and conjunctiva, which grew more marked until the mass was about the size of a hen egg. On examination the pus contained in this swelling was found to be filled with pneumococci in large numbers. An incision into the mass, draining and packing it, was followed soon by healing and a complete return to health.

H. G. G.

Definite Resection of the Outer Orbital Wall.

GIFFORD, H., Omaha (*Ophthalmic Record*, March, 1912), furnishes an account of two operations which, according to the photographs, have given excellent results. The mode of operation is thus described: A horizontal incision is made two and a half inches long, beginning one-quarter inch from outer commissure, care being taken not to open into the conjunctival sac. The lips of the wound are widely separated and the periosteum shoved back from the outer side of the bone. The outer margin of orbit and as much of outer wall as desired is removed with strong bone forceps. The periosteum of the orbit is opened and further procedure is as usual.

The cases were both women. From the right orbit of one the writer removed a multilocular hemotoma one inch and a half long and a quarter of an inch in diameter. The tumor was below and at the outer side of the eye, and consisted of connective tissue filled with pockets one-eighth of an inch in diameter, of coagulated blood; each pocket was separate and

well defined. Vision after the operation was 20/20 —, and has remained good

In the second case the tumor was removed from the optic nerve of the right orbit. Vision before the operation was reduced to shadows, and the nerve was atrophic. In each case the bone was entirely removed. O. W.

Exceptional Causes of Failure in the Operative Treatment of Strabismus.

BIELSCHOWSKY, ALFRED (*Archives of Ophthalmology*, March, 1912), deals exclusively with the failures of operative treatment in strabismus, which he groups as complete success, partial success, and failure. From the results set forth in his paper he concludes as follows: Warning against too hurried operations cannot be too urgent. No case of strabismus should be operated after one examination, because frequently reexaminations allow recognition of possible deviations from the typical—the disassociated character of the anomaly, the inconstancy of the angle, and its dependence upon physical and psychic conditions. In consideration of the fact that there are generally no subjective symptoms in ordinary typical strabismus—either the permanent or periodic—one should search for neuropathic disturbances when subjective symptoms are present. The smaller the strabismus angle and the more prominent the disproportion between it, and the intensity of the subjective complaints, the more conservative we should be with operative procedures. If this cannot be avoided, the patient should be informed of the uncertainty of the result and the possibility of the appearance and continuance of diplopia after operation. In spite of all precaution and care, occasional failures will naturally be unavoidable. But their number will become smaller the more exact our knowledge becomes of the manifold factors in the etiology of strabismus, through which knowledge the basis for therapy will become more clearly defined. H. G. G.

Shortening and Advancement Methods Without Employing Sutures Under Tension.

O'CONNOR, R. P., U. S. Army (*Journal of the American Medical Association*, March 2, 1912), suggests these two operations: First one: (1) Expose the entire tendon to clear

view; (2) elevate the tendon on a spatula, about 1 cm. wide; (3) divide the tendon longitudinally, preferably by a blunt separation of the fibers, into four strips of equal width; (4) loop a strand of twenty-day catgut around each strip of the tendon; (5) throw slack into the tendon by such means as a Prince's forceps, and straighten the catgut until it is taut. This will throw around it a loop of each section of the tendon, and the four loops should be slid along the catgut until they are in contact; (6) secure each marginal strip to prevent the strips from becoming unlooped. Tie ends of catgut over the tendon, but not tight enough to bunch it, so avoiding any constriction and leaving the tendon flat and of about its original width. Close the conjunctival wound.

Second operation: (1) Expose the entire tendon and raise it on spatula; (2) separate from each margin of the tendon a strip about 1.5 mm. wide; (3) place a loop of twenty-day chromic catgut, made flexible by moistening, about each strip, taking care to have it in the center of the tendon when drawn moderately snug; (4) slack the tendon and straighten the catgut by pulling its two ends. This transfers the double hitch from the catgut to the tendon. Slide the two loops of the double half hitch into close contact. Then, still holding the slack, tie the catgut snugly over this double half hitch, but without constriction, as the gut is not intended to take any tension, but simply to prevent the double half hitch from straightening; (5) the central section of the tendon is now slack by the amount of shortening of the margins, and may be tucked or advanced by any method preferred, and the sutures employed will be under no tension unless an attempt is made to exceed the marginal shortening.

M. L. F.

An Unusual Case of Steel Injury.

ALLPORT, FRANK, Chicago (*Ophthalmic Record*, February, 1912), reports the case of a boy, 17 years old, who, two years previously, had been struck in the right eye by a piece of steel which perforated the cornea and lens, but did not remain in the eye. A cataract resulted which gradually became absorbed, leaving him with a vision of 20/20 with correction. On November 27, 1911, he was struck in the left eye with a piece of steel, which perforated the upper eyelid, cornea, iris and lens. The writer saw him the following day and used the

giant magnet to locate the steel, but without result. He then opened the sclera between the external and inferior recti muscles and again used the magnet without result. An X-ray picture, taken on December 3d, showed the steel centrally located, either in or back of the sclera. Another picture was taken with the patient looking straight ahead for a few minutes, and then, without changing the plate, looking to one side. Two pictures of the steel appeared on this plate, showing that the steel moved with the eye. The eye, which up to this time had looked well, now began to show trouble. The tension diminished, the eye was painful on pressure, and the ciliary injection became decidedly marked. Search for the steel proving fruitless, the eyeball was removed; the steel was found to have passed completely through it and was found in a small mass of exudate which was attached to the eyeball. A purulent ophthalmitis had begun in the ciliary region. The scleral opening, made the day after the accident, had healed perfectly.

O. W.

Hardihood of the Human Eye.

HENDERSON, J. F., St. Louis (*American Journal of Ophthalmology*, March, 1912), reports a case in which a large piece of glass was removed from an eye forty days after the accident without causing reaction, and giving the eye a vision of 6/12 one week after the operation.

M. L. F.

Unequal Pupils as an Early Sign in Phthisis.

TUECHTER, J. L., Cincinnati (*Journal of the American Medical Association*, February 24, 1912), reports four cases of tuberculosis of the apex of the lung in which he noticed that one pupil was larger than the other and reacted more sluggishly to light. It is probable that these pupillary symptoms were caused by an involvement of the bronchial glands which caused them to swell and press upon the sympathetic nerve on the affected side.

M. L. F.

Remote Effects of Extirpation of the Gasserian Ganglion.

BROWN, SAMUEL HORTON, Philadelphia (*American Journal of Ophthalmology*, March, 1912), describes the condition found in the right eye of a man from whom the right Gasserian ganglion had been removed fourteen years before to

cure a tic douloureux. He had been free from tic douloureux since the operation, but had suffered at times from lachrimation, redness and mucopurulent discharge from the eye without any pain. Examination of the right eye showed slight entropion and trichiasis of the lower lid, doubtless due to the contraction of the scar following the sloughing out of the sutures inserted to keep the lids closed. The friction of the lashes of this incurved lid upon the cornea caused no discomfort. There was a slight palpebral and bulbar conjunctivitis, and a considerable pericorneal injection, but the most striking feature was a large, superficial, slightly elevated nebula which occupied the lower and outer half of the cornea, avoiding the exact center. The scar was rough on its surface and had the appearance of a flake of some kind superimposed on the cornea. Vision was 5/22.5. The tension was normal. The pupil was about 3 mm. in diameter and very slightly active. It showed a tendency to contract in condensed light, with slight oscillatory movements, but would not dilate in the dark. This was doubtless due to iritic adhesions. No view of the fundus could be obtained.

M. L. F.

ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

(GREAT BRITAIN AND THE ENGLISH COLONIES.)

BY

WALTER R. PARKER, M. D.,

DETROIT.

WM. EVANS BRUNER, M. D.,

CLEVELAND.

NELSON M. BLACK, M. D.,

MILWAUKEE.

EDGAR S. THOMSON, M. D.,

NEW YORK.

AND

W. GORDON M. BYERS, M. D.,

MONTREAL.

Glaucoma Problems.

SMITH, PRIESTLY (*Ophth. Rev.*, 1910). The author's purpose is to speak of certain doubts and difficulties which beset the subject of glaucoma, and in doing so it will be necessary to traverse some familiar ground.

The essence of glaucoma is an excess of pressure in the eye. What causes the excess? Von Graefe found a means of relieving it in many cases—a brilliant and beneficent discovery—but he was not able to explain either the onset of the malady or the curative action of iridectomy, for in his day the physiology of the intraocular fluids had not been worked out.

The aqueous is derived from the capillaries of the ciliary processes. The rate of its production depends on the differ-

ence between the pressure of the blood and the pressure of the fluid in the aqueous chamber, and not on the action of specific nerves. The process, therefore, has the character of physical infiltration rather than of active secretion. The aqueous passes forward through the pupil, and in so doing meets with some resistance on the part of the iris—incalculably small, no doubt, but not entirely unimportant.

There is, at times at least, a minute difference of pressure on the two sides of the iris. The aqueous passes out of the eye by filtering into Schlemm's canal, and probably, though in much smaller quantity, into the veins of the iris and ciliary body with which the canal is connected. Schlemm's canal is apparently protected against closure of its lumen by the pressure of the aqueous; its internal pressure, therefore, may be no higher, and may even be lower, than the aqueous pressure—a condition peculiarly favorable to filtration. Experiment, however, appears to show that the iris veins can take some part in the removal of the aqueous.

The function of the filtration angle was discovered experimentally by injection of fluid, colored or having particles in suspension, into the anterior chamber. The aqueous is formed at the rate of 5 cubic mm. in a minute, so that the whole content of the aqueous chamber is changed in less than an hour. The rate of escape is, of course, equal to the rate of formation, except at those times when the volume of blood within the eye is increasing or diminishing, or when the globe is enlarging or contracting, a change which is possible only to a very small extent.

The vitreous fluid—that which fills the meshes of the vitreous body—has the same constitution as the aqueous, and is derived in like manner from the capillaries of the ciliary processes. The amount passing through the vitreous body in a given time is very much smaller than that passing through the aqueous chamber. A very small amount of fluid perhaps escapes from the vitreous at the papilla, but this is hardly proved; in any case, it is certainly less than one-twentieth of the amount escaping at the filtration angle. The hyaloid and zonula, which form a partition between the vitreous and the aqueous chambers, are permeable by the vitreous fluid, and under certain circumstances, if not continually, give passage to fluid from the vitreous into the aqueous chamber.

The pressure in the aqueous and the vitreous chambers are equal, or so nearly equal that no difference is discoverable by the manometer. Experiment shows that a very slight excess of pressure in either chamber suffices to displace the lens forward or backward, as the case may be. In some abnormal conditions of the eye, however, the aqueous and vitreous pressures are unequal, and the lens is displaced from its normal position. For example, when we lower the aqueous pressure by a corneal incision, the lens advances until the increased tension of the zonula balances the higher pressure of the vitreous. In many forms of disease, and especially in glaucoma, we see a similar displacement of the lens. The pressure of the fluid in the chambers of the eye is derived from that of the blood. The blood pressure in the anterior of the eye is higher than the chamber pressure. Were the relations reversed, the blood vessels would of course collapse. Were the pressure equal, even, the circulation would be in constant danger of arrest. Further, the blood pressure dominates the chamber pressure, not only under normal conditions, but under all conditions so long as the blood circulates. With these facts and principles in mind, let us now turn to the problem of glaucoma. What are the possible causes of plus tension? Speaking broadly they are of two kinds, namely, changes which raise the blood pressure in the eye, and changes which impede the escape of fluid from the chambers.

High blood pressure artificially induced, whether by increasing the inflow or by impeding the outflow of the blood from the eye, is capable of greatly raising the tension of the eye for a while, but not of establishing a permanent excess.

Changes capable of obstructing the escape of fluid from the chambers, on the other hand, are discoverable in almost every form of glaucoma. We should expect them to be of various kinds, and we find them to be so. We find changes in the fluid itself which render it less capable of filtering from the vitreous to the aqueous chamber, and from the latter into Schlemm's canal; changes in tissue, and slitting up of spaces, through which the fluid has to pass; conditions which obstruct its passage through the pupil; and, commonest of all, compression and closure of the filtration angle. We see glaucoma arise without discoverable cause, and we see it occurring as a complication of other disorders of the eye; but even in these

latter cases the essential obstructive change is frequently hidden from inspection in the living eye.

Eyes blinded by glaucoma and excised are hard, not only at the moment of excision, but they remain hard a long while afterward; a proof that their high tension is not merely a consequence of high blood pressure. Tested by injection of fluid into the anterior chamber they are found to permit of little or no escape. Hardened, frozen, and bisected they usually show changes which must have obstructed the escape of the aqueous.

Photographs are exhibited showing secondary glaucoma: (a) the result of a morbid condition of the aqueous, (b) of occlusion of the pupil, (c) where the iris lies behind the lens.

The causes of primary glaucoma are harder to discover. Before attacking the problem, let me remind you of an experiment which throws some light upon it.

Take the two eyes of a freshly killed sheep or pig. Inject them with a colored watery solution. In the one let the pressure be 30 cm. in both chambers—the normal pressure. In the other let the aqueous pressure be 30 cm., the vitreous pressure 35 cm. The result will be strikingly different in the two eyes.

The first, in a few minutes, will show a complete injection of the episcleral veins, and the fluid will soon begin to escape from their divided ends. The iris will be completely hidden. The fluid escapes freely because it has access to the filtration angle. The second, even after several hours, will show no injection and no escape of the colored fluid at any part of the eye. The iris will be hidden by the fluid in a zone surrounding the pupil, but elsewhere will be visibly in contact with the cornea. Filtration from this eye is arrested because the angle of the chamber is closed.

Experimentally, then, we can obstruct the filtration angle by displacing the lens, ciliary processes, and iris towards the cornea. This is important, for a similar displacement occurs in certain forms of glaucoma. The secondary glaucoma of choroidal tumor is one of these.

Acute primary glaucoma bears, in certain of its features, a close resemblance to tumor glaucoma. The anterior chamber is usually shallow. So far the resemblance to tumor glaucoma is striking, but here it ends. We find no solid growth or voluminous exudate to account for the displacement; we find only a well marked swelling of the ciliary pro-

cesses and iris, a condition not usually found in tumor glaucoma.

The nature of the initial disturbance is peculiarly difficult to investigate. In the living eye the condition of the filtration angle cannot be estimated from the visible depth of the chamber. A chamber of normal depth in the region of the pupil may be closed at the periphery, and one which is extremely shallow may have an open angle.

The specimens exhibited appear to show that in primary acute glaucoma the filtration angle is closed by the pressure of the swollen ciliary processes, and they suggest that the initial disturbance is an internal congestion of the eye. The most potent cause of the congestion in an organ or vascular area is obstruction of the efferent veins. In the case of the eye, experiments have proved that ligature of the vortex veins outside the sclera causes intense congestion of the uveal tract, with swelling of the processes and iris, exudation of serum and corpuscles, shallow chamber, and very high tension—in short, an artificial glaucoma of great intensity. This is an illustration of what complete obstruction of the veins can do, but it is nothing more. In actual glaucoma the veins are not ligatured, nor are they even blocked by thrombi, as some writers have suggested; the congestion certainly arises in some more ordinary way.

The various causes of venous congestion are then discussed. Conditions which commonly precede an attack of glaucoma seem to show that the usual starting point of an acute primary glaucoma is congestion of the uveal tract. But not every congestive attack is followed by glaucoma. A congestion which does not obstruct the filtration angle, may, nevertheless, raise the chamber pressure in some degree, cause photopsia, and perhaps suffice to induce mists and rainbows, but it will not start a glaucomatous attack. The congestion which establishes an acute glaucoma appears always to obstruct the escape of the aqueous in addition to raising the pressure of the blood.

Another starting point, less common but not less certain, is dilation of the pupil.

The iris thickens as the pupil enlarges, and, when the chamber is shallow, may come into contact with the cornea near to its periphery and thus block the filtration angle.

Given an obstruction of the filtration angle, whether by swelling of the processes or by thickening of the iris, the progress from bad to worse is easy to understand. The escape of the aqueous is hindered; the chamber pressure rises and tends to compress the veins of the uveal tract and retina, especially near to their points of exit; the venous pressure rises and leads to further swelling of the processes and iris, and further compression of the angle of the chamber. As less fluid leaves the eye, so less enters it. It stagnates more and more. Its pressure approximates to that of the blood. Its constitution becomes altered by exudation of serum. A vicious circle is thus established in which congestion causes blocking of the outlet, and the blocking increases the congestion.

But this explanation of the origin of acute glaucoma is obviously incomplete. Feeble circulation, chill, mental strain, and so forth, are common troubles; acute glaucoma is comparatively rare. Wherein lies the special liability of the unfortunates?

The lens is to some extent responsible. We have seen it encroach on the anterior chamber by advancing. It does the same by enlarging. We see it enlarge in the course of a day or two after an injury, and induce glaucoma by so doing. We know that it enlarges in the course of years by reason of its natural growth.

As it grows larger the free space which surrounds it grows smaller, the anterior chamber shallower, the circumlental space narrower. As a fact we know that the liability to primary glaucoma does steadily increase with increasing age, i. e., with the enlargement of the lens.

Again it is proved that the eyes of subnormal size, which may be known clinically by the smallness of the cornea, are more liable to glaucoma than those of average dimensions.

Certain systemic changes, also, e. g., arteriosclerosis, augmented blood pressure, tendency to edema and to hemorrhage, involve a liability to glaucoma. These, however, seem to be associated rather with the chronic noncongestive form, and with atypical acute attacks, than with typical acute glaucoma—that, namely, which begins with mists and rainbows and is permanently banished by a timely iridectomy.

To the sketch which has been given of acute primary glaucoma some detail must be added. Among other points the

shallowness of the anterior chamber—perhaps the most perplexing part of the problem—needs fuller consideration.

In many cases, probably in the large majority, both eyes show a shallow chamber while, as yet, only one is attacked, the other still appearing healthy. In such cases the want of space is obviously preexisting. It is a physiologic condition, predisposing to glaucoma, not a glaucoma symptom. On the other hand, we certainly meet with cases in which the glaucomatous eye shows a shallower chamber than the healthy eye, and with cases in which the extreme shallowness disappears when an iridectomy has restored normal tension. Here the want of space is obviously a part of the attack. The distinction is probably important, for shallowing of the chamber at the time of the attack speaks of displacement of the lens by pressure from behind, and to some extent reveals the nature of the changes which are going on within the eye.

As life advances the anterior chamber normally diminishes in depth. In old age, and sometimes earlier, it may become extremely shallow, although the eye remains perfectly healthy. The average diminishes, but there are great individual differences.

Is it sufficiently accounted for by the continuous growth of the lens, and by the extent to which lenses differ in size, even at the same time of life?

The continuous growth of the lens has been established by a series of observations, and it appears that the physiologic shallowing of the chamber which accompanies the advance of life may be reasonably attributed to the normal growth of the lens, and that the differences which healthy eyes present in this respect can be accounted for by natural differences among lenses in the way of thickness.

If thickness of the lens is the usual cause of shallowness of the chamber, and shallowness of the chamber predisposes to glaucoma, then the eyes which are attacked by this disorder should, on the whole, be found to contain lenses of more than average thickness. Is this the case? The only way to obtain an answer is to measure the lenses of eyes which have been blinded by glaucoma and excised.

The rest of the paper in this number is devoted to the difference in the effects of various hardening solutions upon the tissue of the excised eye and the conclusion reached that we

want a hardening fluid which can be trusted not to alter the size of the lens; and in view of the opposite effects of the two fluids here in question, it should not be unattainable. Meanwhile the part played by large lenses in primary glaucoma cannot be precisely determined by means of hardened specimens. On the other hand, it certainly cannot be safely ignored.

The want of space between iris and cornea commonly met with in eyes suffering from acute primary glaucoma is certainly, for the most part, a cause rather than a consequence of the disease: the chamber is shallow before the glaucoma begins, as witness the condition of the healthy fellow eye. But it is often, in some degree, a consequence as well; during the attack the chamber becomes shallower still.

The iris alone may be displaced. It thickens as the pupil enlarges. It is pushed forward at the periphery by swelling of the ciliary process, and it is towards the periphery of the chamber that the want of space is most noticeable. It may be further thickened by venous engorgement and edema. In some cases, however, especially in the later stages of the attack, the lens also comes forward; the chamber becomes shallower even in the area of the pupil. What causes the displacement of the lens? An advance of the lens implies that the pressure behind it is greater than that in front. Strange to say, this truism has been vigorously denied.

Then follows a discussion involving the laws of hydrostatics and hydrodynamics within closed spheres. The eye being so considered by one writer and denied by Smith.

In the experimental eye a very small excess of vitreous pressure displaces the lens. There is no reason to doubt that a similar small excess has the same effect in the living eye. That such an excess can, and does, occur is beyond question. The problem is to determine its cause. Comparing the advance of the lens in acute primary glaucoma with the same phenomenon in tumor glaucoma (see *Ophthalmic Review*, 1910, p. 355) we find a significant difference.

In the former case the vitreous is slowly compressed by a gradual accumulation of fluid behind the retina. In the latter it is compressed more or less suddenly by an accumulation of blood in the veins of the uveal tract.

But a persistent displacement cannot be accounted for sim-

ply by an increase in the volume of blood in the eye. A persistent forward displacement of the lens appears to indicate either (a) a relative increase in the amount of fluid entering the vitreous as compared with that entering the aqueous chamber, or (b) a hindrance to the filtration of fluid from vitreous to aqueous.

The above headings are then discussed.

TYPICAL ACUTE PRIMARY GLAUCOMA, SUMMARY.

The attack is usually induced by congestion of the uveal tract, and this may arise from any cause which overfills the veins of the head and eyes, e. g., insufficiency of the heart, disturbance of the respiration, want of muscular exercise, nervous exhaustion, chill, constipation.

It is not an expression of high arterial pressure. It is sometimes seen in persons whose blood pressure is subnormal, and very many whose blood pressure is extremely high go free.

It does not originate in inflammation. The suddenness with which an attack may be cut short by contracting the pupil precludes the idea of an initial inflammatory process. For the typical form of the disorder the term inflammatory, still used by continental writers, should be discarded and the term congestive adopted.

Congestion of the uveal tract induces glaucoma by interfering with the escape of the aqueous; the filtration angle is compressed.

Conditions which congest the head and eyes are common, whereas acute glaucoma is comparatively rare; congestion induces glaucoma only in certain cases. Some eyes are more liable than others to compression of the filtration angle.

The liability increases with age, and this appears to depend chiefly on enlargement of the lens. The average volume of healthy lenses increases throughout life, but at every time of life the volume differs considerably in individual cases.

The size of the lens varies in relation to the size of the eye. In small eyes the lens is sometimes relatively large. Small eyes show on the whole a greater liability than eyes of the average size. They may usually be known by the smallness of the cornea.

The shape of the lens varies considerably, some lenses being comparatively thick from front to back and small transversely.

others thinner and wider. These differences affect the depth of the anterior chamber and the width of the circumlental space.

In a healthy eye a shallow chamber usually means a thick lens. In an eye suffering from acute primary glaucoma it may mean a thick lens, or a displaced lens, or both.

If the glaucomatous eye has a shallow chamber, and the healthy fellow eye an equally shallow chamber, the lens is probably thick in both and not displaced.

If the glaucomatous eye has a shallower chamber than the healthy eye—shallower not only at the periphery but in the area of the pupil—its lens is pushed forward by excess of fluid in the vitreous chamber and the fluid is probably abnormal in character.

An attack which begins with an advance of the lens is probably due to morbid exudation or hemorrhage in the posterior segment of the eye, not to congestion only. N. M. B.

A Case of Retinal Disease With Detachment, in a Child.

GREEVES, R. A. (*Ophth. Rev.*, December, 1911). The patient, a well-grown healthy boy of six years, was brought to the Royal Westminster Ophthalmic Hospital with a red and painful left eye, and a history that the eye had been in this condition for a week. Prior to this no difference in the eyes had ever been recognized except that the left eye was liable to turn outwards at times. This had been first noticed when the child was a year old. There was no history of any previous illness except measles six months ago. The patient had had a severe blow on the left side of the head and face two months before the onset of the present trouble.

On examination, there was no perception of light in the left eye, the pupil was semidilated and inactive; the tension was high. There was no fundus reflex, but the retina and its vessels could be seen plainly by focal illumination. It was seen to be pushed forward behind the lens, and it exhibited an absence of mobility and transparency which gave the impression that there was something solid behind. The right eye was normal and emmetropic.

The eye was enucleated and examination showed there was a mass of highly organized fibrous tissue surrounding the papilla. This mass apparently represented the outer layers of

the overlaying retina, with which it was continuous. Associated with it were recent hemorrhages as well as spaces containing cholesterolin crystals. The rest of the retina was detached and thickened. There was no vascular disease. Secondary glaucoma was present and appeared to be recent.

The disease was obviously of a chronic nature, the recent rise of tension being possibly explained by the large hemorrhages.

In the history of the case under discussion this fact was elicited: that the birth was an instrumental one; this suggests that an injury at birth may have been the primary cause. And it is possible that the recent injury mentioned above may have excited recent changes.

N. M. B.

A Simplified Form of Amblyoscope for Use in Convergent Squint.

HUDSON, A. C. (*Ophth. Rev.*, December, 1911). The instrument figured in the text has been devised for the investigation and training, on the lines laid down by Worth in his book on squint, of the fusion sense in convergent squinters. It consists of two wooden bars crossing one another diagonally, each of which is 33 cm. in length, and is provided at its distal end with an upright picture carrier, and at its proximal extremity with a lens of a strength of $+3$ D combined with a prism base inwards. Each bar is perforated by a central longitudinal slot, and through both slots passes a stout upright pin carrying a screen with a small central diaphragm, which is thus capable of a considerable anteroposterior excursion. The distance between the lenses can be varied to correspond with the interpupillary distance of the patient by means of a simple screw and slot arrangement, while that between the pictures varies with the position of the diaphragm screen. The strength of the prisms is such that when the two picture carriers are in apposition one to another an orthophoric individual will obtain accurate fusion of the images of the pictures. Approximation of the diaphragm screen to the proximal end of the instrument leads to an increasing separation of the pictures, the angle between the visual axes of the observer necessary for the maintenance of fusion of the images in any given position of the screen being indicated by a semicircular scale attached to the screen; in this manner the two pictures may be so placed as to lie in the visual axes of the two eyes in any case of convergent

squint. The central bar gives increased steadiness to the crossed bars, and also serves to carry a screen by means of which a variation in the relative illumination of the two pictures may be obtained.

In the investigation and treatment of a case of convergent squint the crossed bars are at first set at an angle corresponding with that of the squint, and the presence or absence of binocular vision and of the stereoscopic sense is ascertained; the examination being aided when necessary by a relative variation in the illumination of the two pictures. Binocular vision having thus been elicited the diaphragm screen is moved slowly forwards, the movement being accompanied by an approximation of the pictures, and consequently, as long as fusion is maintained, by an approach towards parallelism of the visual axes. This movement is continued until binocular vision can no longer be maintained, as shown by the patient's statement that he sees only half of the diagram, and by a sudden movement inwards of one eye. A reversion is then made to the original position of the diaphragm screen, and the process is repeated. The diagrams devised by Worth are admirably suited for these exercises.

N. M. B.

The Relation of the Lacrimal Fossa to the Ethmoidal Cells.

HENDERSON, E. E. (*Ophth. Rev.*, December, 1911). In view of S. E. Whitnal's paper (abstract of which appears in this issue) the following case is reported:

The patient was a middle aged woman, who was brought to me by the house surgeon as I was leaving the hospital, suffering from what appeared, on a somewhat casual examination, to be a large lacrimal abscess. There was no previous history of lacrimal trouble. I asked him to arrange to give her gas and open the abscess. I had left the hospital before this was done, so did not see the small operation, but was told by the house surgeon that he only found a small quantity of pus. When I saw her a week later the incision had healed and there was no evidence of inflammation. The whole of the lacrimal fossa was occupied by a round hard mass, in which no fluctuation could be detected. It was not tender. There was no regurgitation on pressure, but fluid did not pass down the lacrimal duct. I therefore took her in for operation. I made the usual incision for removal of the lacrimal sac. On puncturing the

thick fibrous wall of what I thought was a large and dilated lacrimal sac, a quantity of stringy yellow mucus made its appearance. When this was all removed, a large cavity reaching well into the nose was apparent, which was evidently a dilated ethmoidal cell. With one finger in the nostril and the other in this cavity I made a passage through into the nose and inserted a large drainage tube. The tube was gradually shortened and eventually discarded at the end of ten days. The patient had no further trouble, and has now ceased to attend.

N. M. B.

On an Epidemic of Conjunctivitis Associated with the Presence of a Gram Positive Diplococcus Resembling, but Distinct From, the Pneumococcus.

MCGOWAN, J. P., and TAYLOR, W. MC. (*Lancet*, November 11, 1911). The paper deals with an epidemic of conjunctivitis in an institution, and the facts are considered worthy of record, in the first place, because the outbreak was associated with the presence of an organism which, we believe, has not previously been described; and, secondly, because of the liability of this organism to be confused with the pneumococcus in a superficial examination, such as is generally employed in ophthalmic practice.

Cultural Characteristics.—The organism grows well on blood agar at 37° C. On gelatin at 18° C. it does not grow. There is no growth on potato at 37° C. It grows well on inspissated blood serum at 37° C. Litmus milk incubated at 37° C. is usually unchanged, sometimes a little acid is formed after a long time, but never any clot. The organism, therefore, differs culturally from the pneumococcus in its action on litmus milk, its fermentation of sugars, and especially its nonfermentation of inulin, and the production of punctate spots and absence of turbidity in fluid media.

Microscopic Appearances of the Organism in Culture.—The organism is nonmotile. It is a Gram-positive diplococcus, the elements of which are elongated and in a great many instances of typical lancet shape. There is a marked tendency to agglomeration with this organism. This is further shown by what happens when one filters through filter paper emulsions made from blood agar cultures of the organism; with equally turbid emulsions the pneumococcal emulsion comes through practically as turbid as before, while the emulsion of this organism comes

through practically clear. So much was this the case that comparative agglutination tests with this organism and the pneumococcus were impossible. The size of each coccus is from 0.7 to 1 micron long by 0.5 micron broad at its widest part, being thus of the same size as the pneumococcus. The organism stains readily with the ordinary dyes. There are no spores present. With regard to the presence of capsules in the organism in cultures, this point has not been definitely settled. They were not obtained after several trials on fluid rabbit serum, using Hiss' method of staining, but an undoubted culture of pneumococcus of the same age treated at the same time and in exactly the same way, similarly showed no capsules.

Inoculation Experiments.—The organism has not been found to be pathogenic to either mice or rabbits. A small rabbit was inoculated intraperitoneally with some secretion, freshly removed from the eye of one of the cases, without any noticeable effect. Extensive twenty-four hour agar cultures immediately on isolation were injected simultaneously into mice without effect.

N. M. B.

Observation Upon the Treatment of Gonorrheal Conjunctivitis in the Adult.

HOSFORD, J. S., AND JAMES, G. B. (*Lancet*, January 13, 1912), believe that the disastrous results frequently observed in this disease in cases over thirty years of age are not only unnecessary but preventable, if the patient is seen early and appropriately treated.

The patient is placed in bed and remains there until all danger is passed. A light diet is prescribed. Mercury and saline purges are given and asperin, gr. x., and quinin bisulphate, gr. x., administered thrice daily.

Local treatment consists of a constant douche day and night applied mechanically by fastening a fine rubber tube to the forehead by means of adhesive plaster and allowing a stream of 1-15,000 to 1-20,000 permanganate solution to trickle constantly across the palpebral fissure, encouraging the patient to open the lids every ten minutes. In the later stages of the disease a boric acid solution, grs. viii to the ounce, is used. With great chemosis of the lids the outer canthus is freely excised. No change in treatment is instituted for corneal ulcer. The chemosis subsides on the eighth or tenth day, when atropin is

used, if there is any iritis, which rarely occurs under this form of treatment. There is some suffering from insomnia in the early stages, but it is controlled by veronal. It is important that an uninterrupted stream trickles over the eye and the fluid not be allowed to fall drop by drop, as it is then apt to produce a peculiar mental irritation. N. M. B.

Ocular Muscle Balance.

MADDON, ERNEST E. (*The Ophthalmoscope*, March, 1912). The perfect concert of the two eyes, by which we see single, and to which the eyes owe their look of mutual understanding, is so largely maintained by habit, that were one eye to become suddenly blind it would still appear to an ordinary observer to follow every movement of the other with unerring fidelity. In reality, however, an invisible deflection of the visual line does take place, minute in some cases, more considerable in others, showing that the "balance of the eyes," as it is often called, is not perfect.

Innervations.—The balance of the eyes is maintained by their conjugate innervations, which may be divided into two classes or kingdoms, neither of which attempts to fulfill the function of the other. The first class unifies the two eyes, the second directs them. The first class preserves the integrity of the cyclopiian or binocular eye, while the second class presides over the parallel motions of the eyes, including in that term not only the parallel motions of the two visual axes, but also the parallel torsions of the two eyes about those axes, since we need not only the help of the former to locate the direction of objects in space, but also of the latter, to keep the eyes true for learning the relation of the same objects to the vertical.

SCHEME OF TWELVE BINOCULAR INNERVATIONS.

KINGDOM I.—FOR CREATING THE BINOCULAR EYE.

Contrary	{	Horizontal	{	1. Convergence.
			{	2. Divergence.
		Vertical	{	3. R., Relative elevation over L.
			{	4. L., Relative elevation over R.
	{	Torsional	{	5. Binocular intorsion.
				6. Binocular extorsion.

KINGDOM II.—FOR DIRECTING THE BINOCULAR EYE.

Parallel	{	Horizontal	{	7. Binocular dextroduction.
			{	8. Binocular levoduction.
	{	Vertical	{	9. Binocular elevation.
			{	10. Binocular depression.
	{	Torsional	{	11. Binocular dextrotorsion.
			{	12. Binocular levotorsion.

Innervations 1 and 2 of the first kingdom preserve us from horizontal diplopia, and also tell us the distance of objects, but they have nothing to say about their direction in space.

Those numbered 3 and 4 preserve each visual line from rising higher than the other. Innervations 5 and 6 keep the prime retinal meridians functionally parallel with each other, one approximates these meridians above, the other below, effecting respectively binocular intorsion and extorsion.

In kingdom II, innervations 7 and 8 control the parallel motions of the visual lines to right and left respectively, while 9 turns both eyes upwards, and 10 both downwards. It is by our deep appreciation of these four well known innervations that retinal images are projected along their true direction in space. When we see a bird, it is not exactly the bird that we see, but an image of it, which the brain has projected with such fidelity as to occupy the same position in space as the bird which gave rise to the image.

Innervations 11 and 12 roll both eyes simultaneously in the same direction about their visual lines, to the right and left respectively. This may account for the want of permanence in the correction of some cases of astigmatism; one innervation by slightly preponderating over the other creates a slow torsional displacement of the two eyes, to follow which the axes of the cylinders require displacing in parallel directions. It is by these two innervations that we alone judge the inclination of objects from the vertical. The extraocular muscles, under the guidance of these twelve binocular innervations, make the two eyes work together as one.

In comitant muscles, defects may in the course of time become concomitant, a conjugate innervation sending stronger impulses to one eye in proportion to the difference in strength of the muscles employed, and it may be said that each conjugate innervation tends in time to divide its neuromuscular energy equally between the two eyes.

Influence of Fusion.—Eyes are considered to be well balanced when their poise with relation to each other is but inconsiderably affected by such an act as covering an eye with the hand and suddenly unscreening it. The eyes are provided with two adjustments, a coarse and a fine. The coarse adjustment is by cerebral association of all those innervations which habitually work together, whereas the fine adjustment is by a complex visual reflex action, the faculty of fusion, which requires a far greater exercise of specialized brain cells.

Appliances.—The object of all tests which dissociate the eyes is to find out what proportion of work is performed respectively by these two adjustments. The history of appliances which lead up to the perfected phorometer is dwelt upon. With the glass rod test, the image is elongated into a line of light and possesses the advantage that slight inaccuracies in the position of the rod do not materially effect its efficiency.

Should there be any suspicion that in spite of the dissimilarity of the images the mind makes some slight attempt to unite them, the glass rods, while in position, should be screened with a visiting card, and the patient be instructed to state the position of the red streak at the first instant of its appearance following the sudden withdrawal of the card. In this way we really discover the position of an eye excluded from vision. Reber suggests twisting the line through 90° and then suddenly restoring to its original position.

There are numerous other modes of producing dissociation and measuring muscle balance. A simple method requiring no apparatus is as follows: A visiting card or envelop is held with its upper edge coincident with the horizontal diameter of the pupil, and another with its lower edges coinciding with that of the other pupil: any vertical line looked at, such as the cord of a window shade, will at once manifest any latent deviation, by the upper half of the cord appearing displaced from the lower in proportion thereto. For vertical diplopia a single piece of paper suffices, held vertically between the two eyes while a horizontal line is regarded.

Tests for Paresis.—Whether heterophoria is paretic or concomitant can easily be ascertained by repeating its measurement with the head placed in different positions, one position selected to make the least call, and another to make the greatest call, upon the action of the suspected muscle.

Breadth of Fusion.—The difference between latent deviations and some kinds of manifest squint is merely one of degree. The moment a deviation becomes greater than the breadth of fusion, the eye escapes into a manifest squint. It stands to reason, therefore, that there must be borderland cases in which the fusion faculty is only just able by the greatest effort to hold its own. The difficulty may spring either from the breadth of fusion power being small, or from the deviation being great; nor is it surprising that headache should occur under either condition. For measuring what reserve of fusion power is possessed by the eyes, either the monocular class of prism combinations, as Landolt, Risley, Jackson and others, or the binocular "prism verger" of the author's, is used.

Varieties of Muscle Balance.—Esophoria is generally due to latent hypermetropia. When in near vision only, it is certainly due to that, or to some defect of accommodation which may be cycloplegic in young people, or presbyopic in the elderly. In distant vision it may be due to weakness of the diverging innervation, or to excessive tonus in the converging center, as from the exercise of excessive convergence in myopes when reading.

Its treatment, except in the myopic kind, is by convex lenses, either for distance or near, as the case requires. Should this not suffice, the diverging faculty may be exercised by training prisms, edge outwards, mounted in a spectacle frame. The patient should with these fix some near object attentively, and slowly recede from it until diplopia threatens, there remaining until a still further recession is possible. If this be done every day, as suggested by Gould, at a time when the bodily powers are at their best, the diverging function will be strengthened.

The prism verger may also be used especially for distant vision. The prisms, starting from the vertical, have the edges rotated outwards till diplopia threatens, then partly returned again and the process repeated. Myopic esophoria is curable by training with the verger, or, that failing, by operation. Esophoria must be present in near as well as distant vision to indicate surgical interference, and advancement of the external rectus is advisable in most cases, graduated tenotomy of the internal in few.

Exophoria is generally due to want of tone of the converging innervation, brought about either by impaired health, by

reflex withdrawal of nerve energy, or by want of support from accommodation, as in myopes. Since convergence is an easier task than divergence, exophoria of high degree is often tolerated perfectly.

Our first endeavor should be to treat the cause, and if there be any error of refraction, that should be undercorrected in the case of hypermetropia and fully corrected in myopia. In very young children with exophoria, I have even ventured to overcorrect the myopia, with excellent results. Bracing air, exercise and nerve tonics, such as Bynin-Amara, with open windows at night, should be prescribed.

Prism training is often very effective, for even though it may not much lessen the exophoria, toleration for it is acquired. The prism verges answers for this purpose.

Errors of refraction should be undercorrected in the case of hypermetropia, and fully corrected in myopia. Prism training is often very effective. the prism verges answers well for this purpose. Prisms for the relief of exophoria should never correct more than a quarter or a third of the defect at the most, since they withdraw the support which the accommodation is accustomed to receive from the converging effort. "The effect of prisms may be readily obtained by decentering lenses, dividing 18 millimeters by the number of diopters in the lens for each degree of deviation." Lastly, advancement of one or both internal recti is advantageous in some cases of exophoria, avoiding tenotomy as a rule.

Hyperphoria is probably congenital in many cases, often wonderfully persistent year after year. Temporary hyperphoria may sometimes be produced by bent spectacle frames in which one lens is higher than the other. Relieving prism, so satisfactory in the treatment of low degrees of hyperphoria, may be allowed to correct three-fourths of the defect, edge up before the hyperphoric eye, or down before the other, or both. Training may enable toleration of the defect.

In higher degrees, careful tenotomy of the superior rectus of the higher eye, or advancement of the superior rectus of the lower eye, may be practiced. In selecting which of these two procedures to adopt, we should be guided by the cyclophoria present, since incyclophoria is relieved by the tenotomy and excyclophoria by the advancement; also we should take into account any anaphoria and cataphoria, in the former of which

the motor field exceeds the usual limits upwards and comes short of them downwards, while in the latter these conditions are reversed. Operation should be such as to lessen the excessive and increase the deficient excursions.

Stevens' tropometer may be used in measurement of the motor field. The normal excursion upward is taken to be 33° , downward 55° , inwards 55° , outwards 50° .

Cyclophoria is the tendency for the eyes to rotate about their own visual lines as soon as they are liberated from fusion so that their vertical diameters lean towards, or away from, one another. In the first case it is called incyclophoria, in the second, excyclophoria.

Cyclophoria is very easily revealed by the glass rod test, since if the disc of rods be placed in a trial frame, it can be rotated like a trial lens, until the streak of light appears perfectly vertical to the patient. The torsion of the eyeball then agrees with the displacement of the rods from the vertical or from the horizontal. Numerous cyclophorometers have been introduced, mostly utilizing either the double prism or glass rods or both. Dr. Stevens has devised an instrument which he calls "Clinoscope," by which the amplitude or range of binocular torsion can be measured.

Excyclophoria is a much more common condition than incyclophoria, and may, in its minor degrees, be wholly disregarded. It plays the part in torsional balance that exophoria does in horizontal balance.

Simple cyclophoria rarely requires treatment other than constitutional and the correction of any refractive error.

False Torsion.—The parallel motions of the eyes are unaccompanied by torsion when they take place in either of the four cardinal directions, viz., directly upwards, downwards, to right, or to left. In every other direction they are accompanied by torsion, and to each direction of vision belongs a definite and constant amount of torsion, independent of the route by which that direction has been reached.

False torsion can be compared to great circle sailing. The change of course experienced by the track of a ship in crossing successive meridians during great circle sailing, agrees perfectly with the torsion of the eye when the pupil follows a path similar to the ship's track. The tables published by the admiralty become thus immediately available for solving any

question of false torsion. Instead of thinking of the rotation of the eyeball as a whole, imagine it to be a spherical sea, over the surface of which the pupil sails like a ship. In arriving at any secondary position, after starting from the primary, the pupil will have rotated like a wheel to precisely the same extent that the ship's course would have changed in following a similar course, provided that the starting point be that of the primary position of the eyeball.

Meissner's Torsion.—Meissner found that when a vertical thread is held either further from or nearer to the eyes than the point of fixation, its double images are inclined to each other in such a way as to indicate rotation of each eye about its visual line outwards. This binocular extorsion increases with the elevation of the visual plane, and also with increasing nearness of the fixation point. On looking downwards it becomes less, until, at a certain angle of the visual plane, it disappears altogether; and if the eyes look lower still, it may even give way to torsion in the opposite sense, viz., binocular intorsion.

Nature has clearly adapted the eyes for looking downwards when engaged in near work, and since Meissner's torsion becomes greater when the eyes look upwards for near work, it is possible that Meissner's torsion, or rather the efforts made to correct it, may contribute one element to the ocular fatigue which brings on miner's nystagmus.

Chart Making.—The author demonstrates by means of diagrams the relation between relative accommodation, as first investigated by Donders, and relative convergence, which latter is identical with "breadth of fusion," and illustrates method of charting, as method of entry in case book. W. R. P.

Some Manifestations of Pituitary Growths.

EVANS, J. JAMESON (*British Medical Journal*, December 2, 1911) discusses the anatomy and physiology of the pituitary body, and classifies the manifestations of pituitary neoplasms into: First, those which may be ascribed to excessive action of the glandular epithelium of the anterior lobe, hyperpituitarism. Second, those which may be ascribed to a diminished functional activity of the anterior lobe, hypopituitarism. Third, the mechanical effects of an intracranial tumor, showing definitely localizing symptoms which can be explained by the anatomic relationships of the enlarged organ. Fourth, confirmatory

evidence of enlargement or atrophy of the hypophysis is supplied by radiographs of the sella turcica, though naturally the size of the gland and its bony recess is no guide to the functional activity of the gland.

Hyperpituitarism.—Under this head he places acromegaly, and gigantism; the latter being acromegaly of the growing period, while acromegaly in itself belongs to the period of completed development. The essential feature in each case is exaggerated growth of the skeletal tissues, hard and soft, especially of the extremities, associated with alteration in the physiognomy and in the contour of the skull.

The symptoms which may be ascribed to the mechanical effects of the intracranial tumor may include headache, vertigo, vomiting, tinnitus, polyuria or glycosuria, convulsive or apoplectic attacks, certain psychoses, including delirium, delusions, perverted or excessive appetite, and melancholia. Mental and physical torpor are often complained of, and whereas the pulse may be accelerated, the temperature of the body is lowered.

The localizing symptoms of the intracranial growth are mainly exhibited in connection with the eyes and the ocular muscles.

Impairment of vision in one or both eyes is often complained of, and in cystic or vascular tumors, which may vary in size or burst, the vision may be definitely variable. The impairment of vision may be associated with the appearance of a blue haze over everything. As a general rule, the impairment of sight slowly but surely progresses to almost complete blindness.

Alterations in the visual fields are a striking feature of pituitary enlargements, and bitemporal hemianopia is the most common and most characteristic of these alterations. In the advanced stages of this condition the patient feels as if he were walking between two high walls. In many cases the temporal hemianopia is unilateral, owing to complete loss of sight in one eye; this is, as might be expected, when we remember that the growth is often irregular and is liable to press on one nerve more than the other. For the same reason the boundary line between the blind and the seeing parts is hardly ever regular or vertical. When the boundary line is vertical, or approximately so, it generally passes through the point of fixation—a fact which helps to distinguish chiasmal lesions from lesions

of the optic tract and cortical centers, in which the macular field is spared. The other more common variations in the visual field are concentric contraction and central scotoma, but homonymous hemianopia and the loss of the whole field, with the exception of one quadrant, have been described. The contraction progresses from above downwards and inwards, as rule, but a surer guide as to the probable type the contraction will eventually assume is to be found in the character of the color fields. It will often be found that the color fields are definitely hemianopic, while the fields for white are almost full. Accentuation of the defect in the field can also be shown by Bjerrum's method.

The usual condition of the optic nerve is one of partial or complete primal atrophy (50 per cent), but papillary edema and postneuritic atrophy have also been recorded (15 per cent each).

Large growths involve other structures than the optic nerve, and give rise to such symptoms as oculomotor paralysis, including paralysis of the third nerve, paralysis of the sixth nerve, total ophthalmoplegia, nystagmus. Trigeminal lesions are exceptional, but when present may lead to neuroparalytic keratitis. Exophthalmus, prominence of the eyebrows, with pigmentation and thickening of the eyelids and hypertrophy of the palpebral glands, have been noted.

Pupillary reactions are of little diagnostic value. The hemiopic pupil phenomenon of Warnicke can seldom be elicited, and in any case it is of somewhat uncertain import.

Hypopituitarism.—Under this head he includes cases of retarded skeletal development or infantilism, also certain cases in which there is excessive development of fat, and mental and physical torpor, and disturbance of sexual functions. The ocular condition of the cases have not as yet been very thoroughly investigated. Several cases are reported in detail.

E. S. T.

Complete Congenital Dislocation of the Lens in a Family History.

GUNN, A. RUGG (*The Ophthalmoscope*, April, 1912), gives a record of dislocated lenses occurring in a family through four generations. Eighteen were affected and nine were normal. Six affected individuals had been examined, three adults and three children. In the children the lens in each case could be

seen floating free in the vitreous chamber. The vision in each case was markedly improved by $+10$ D spheres. In the other members of the pedigree the histories clearly pointed to a similar condition, and the author assumes there was congenital aphakia due to dislocation of the lens, not improbably as a result of absence or imperfect development of the suspensory ligament. Each family contained both affected and unaffected individuals.

Examination of the pedigree shows at once that the condition is certainly not a Mendelian recessive; also that it affects both sexes in equal numbers. In two families with four and two children respectively, it seems to behave as a pure dominant; in all the others there are both affected and unaffected individuals, the former preponderating. The only unaffected individual who has a family, it is interesting to note, has all his children (four) unaffected. We may assume, then, that the normal condition is recessive to the abnormal, and that, therefore, the latter probably differ from the others, not in lacking something essential to complete development, but rather in possessing some additional character or factor in virtue of which the normal development of the suspensory ligament is interfered with. On this assumption, and owing to the fact that the majority of the families contain both affected and unaffected individuals, we must regard the affected individuals as heterozygous for this inhibitory factor. Assuming, further, that each marriage has been between such a heterozygote and a homozygous normal, which we are justified in doing in the absence of any history of cousin or other interrelation marriages, we should expect as a result an equal number of affected and of unaffected offspring. The actual results, however, show a large preponderance of affected individuals. Tabulating the offspring of the union of an affected with a nonaffected parent, we find as follows:

Affected.	Non-affected.
4	1
4	1
4	0
3	3
2	0
<hr/>	<hr/>
17	5

The total of the five such families is twenty-two, viz., seventeen affected and five nonaffected individuals, a result suspiciously like the 3 to 1 simple Mendelian ratio. Further, on examination of the individual families, it is curious to find two containing (1) members which apparently throw off only affected individuals when married to a normal recessive; (2) members which throw off both recessive and dominants, in one instance, in equal numbers; and (3) one member at least breeding true to the recessive character. Such a result, however, is not in this instance found in association with the union of two heterozygotes, and at present we must regard its significance as unknown.

We are justified, however, in tentatively concluding that (1) normal is recessive to abnormal, and (2) the individuals exhibiting the latter condition are heterozygous in composition for a certain factor in presence of which the usual development of the suspensory ligament of the lens is inhibited.

But what is this inhibitory agent? Two hypotheses suggest themselves: (1) the suspensory ligament may become ruptured after its formation, a suggestion the advanced development of the lens lends some color to, although, on the other hand, the exact nature and mechanism of the etiologic factor on this assumption is difficult to conceive, or (2) it may be prevented from forming at all. In an early stage of development the lens vesicle practically fills the optic cup, which afterwards, in virtue of its more rapid increase in size, grows away from it. But it is during this stage of contact that the cellular adhesions between the equator of the lens vesicle and the ciliary body, described by Treacher Collins as the mode of formation of the suspensory ligament, occur, and anything which would interfere with intimate contact until the increase in size of the optic cup became pronounced, would, of course, render difficult the formation of a functional suspensory ligament. Such a condition would seem to be fulfilled by an undue persistence of that portion of the intruding mesoblast known as the posterior fibrovascular sheath, although the complete development of the iris and the clinical absence of any remnants indicate that such a persistence could not have been unduly prolonged.

W. R. P.

A Case of Bilateral Congenital Anterior Staphyloma of the Eyeball, with Histologic Examination.

STEPHENSON, SYDNEY (*The Ophthalmoscope*, April, 1912), reports a case of congenital double staphyloma. When the mother was three months pregnant some boiling bacon fat splashed into her eyes. In consequence of the accident she was unable to open her eyes for four or five days.

On admission the baby weighed $4\frac{1}{2}$ pounds. A large translucent fleshy staphyloma, over which the lids could not close, was present in each eye. There were no signs of pigmentation. There were no evidences of recent inflammation in the palpebral conjunctiva in particular of antecedent ophthalmia.

Other congenital deformities present are as follows: 1. The head is spherical, measuring $11\frac{1}{4}$ inches in circumference (microcephalus). 2. The ears are normal as regards shape, but from the posterior surface and the helix there grows forward a fringe of long, soft, dark hair. 3. The right testicle cannot be felt in the scrotum, although the left one is in place (monorchism). 4. The little finger is small and incurved—it is, in fact, of Mongolian type. 5. The lower extremities show several deformities—(a) no movement of the hip joint can be elicited; (b) the patellæ appear to be absent; and (c) the knees cannot be flexed, but extension is possible to the extent of a right angle on both sides (genu recurvatum).

The child died when aged sixty-seven days. Postmortem was refused, but both eyes were removed. The right globe measured 23 mm. by 14 mm.; the left 22 mm. by 10 mm.

After giving a detail histologic report, the author adds the following remarks:

"The appearance of the eyes during life was believed to be more suggestive of maldevelopment than of inflammation, an opinion expressed by me when I brought the patient under the notice of the members of the Ophthalmological Society. The associated condition of the palpebral fissure, the microcephalus, the monorchism, the genu recurvatum, and, lastly, the absence of the patellæ, appeared to point strongly to the same conclusion.

"This view, formed on clinical grounds, was fully substantiated by the results of microscopic examination. The eyeballs showed not a trace of antecedent inflammation. Neither could the changes present be explained on that view. On the other hand, the eyeballs manifested many evidences of retarded de-

velopment, especially in the absence of the anterior chamber, of the iris, of Descemet's membrane, and of the endothelium of the cornea. The hole in the posterior capsule of the crystalline lens, moreover, told in the same direction.

"The developmental failure in this case has evidently fallen upon the mesoblast, which at an early period of fetal life passes in between the surface epiblast and the rudiment of the crystalline lens, and from which are eventually developed the substantia propria of the cornea, Descemet's membrane, the endothelium of the cornea, the ligamentum pectinatum, the pupillary membrane, and the stroma of the iris. No excretory channels are present in such a case. Assuming, as we must do, a rise in intraocular tension during fetal life, we have an explanation of the staphylomatous pseudocornea, moulded as it were on the underlying lens without the interposition of an anterior chamber, the stretched ciliary processes, and of several other points shown by specimens."

W. R. P.

Four Generations of Blue Sclerotics.

DRIGHTON, CHAS. A. ADAIR (*The Ophthalmoscope*, April, 1912), reports a family of Welsh extraction showing blue sclerotics. Patient, aged 49 years, head of present generation, marked azure blue sclerotics, gerontoxon. Slight hypermetropia both eyes. Has had fracture of both legs as a child, and in recent years fractured olecranon of right arm whilst swimming.

Patient had one sister who did not have blue sclerotics. His father had them, but his father's two sisters had no sign of them. Patient married; his wife, a woman aged 42, has not blue sclerotics. From this marriage there are seven children.

The two daughters both have blue sclerotics, and each had fractured legs from trifling causes. Of the five sons, four had blue sclerotics, two of whom had had bones fractured.

W. R. P.

Serum and Vaccine Therapy in Connection with Diseases of the Eyes.

BRYAN, C. W. G. (*British Medical Journal*, March 30, 1912), divides the serums into the specific and nonspecific. Serum has usually been injected into the subcutaneous tissues,

which is the safest; in the muscular tissues, or into the blood-stream, which gives the most rapid effect.

1. Diphtheria Antitoxic Serum.—Extremely good results have been reported from this treatment. The dose should be 2,000 to 10,000 units, and at least two doses are necessary. In membranous conjunctivitis, due to the Klebs-Loeffler bacillus, the Roux serum is valuable. In corneal diphtheria the serum is less effectual, and this is due to the mixed nature of the infection from the presence of the organisms of suppuration. In such mixed infections Römer's antipneumococcus serum and polyvalent antistreptococcus serum are of use. Antidiphtheritic serum is useful in postdiphtheritic paralysis of the eye muscles.

2. Tetanus Antitoxic Serum.—A few cases have been reported when the primary infection was through the eye, and in these cases the serum was valuable.

3. Specific Antipneumococcus Serum.—A polyvalent serum made by Römer is the best known.

4. Antirheumatic Serum.—Rosenthal claims good results in rheumatic iritis by the use of the specific serum prepared by immunizing animals against the streptococcus rheumaticus. These results have not been corroborated.

5. Antistreptococcus Serum.—Polyvalent serum has given occasional good results in streptococcal infections of the eye, but the results are not constant, owing to the enormous number of strains of streptococcus which have been demonstrated.

6. Antigonococcus Serum.—This serum has proved of value in cases of gonococcal iritis, but is of no value in conjunctivitis.

7. Antistaphylococcus Serum.—Some results of value have been attained, these infections being most favorable to the employment of vaccine.

8. Nonspecific Serum.—Good results have been obtained in conjunctivitis, ulceration of the cornea, and in postoperative and traumatic infections. Burkhard has used antidiphtheria serum in four cases for exophthalmic goiter.

Deutschmann has introduced a paraspecific yeast serum for which excellent results have been claimed in many forms of eye disease. His results have been corroborated by many workers.

Römer employs a serum for counteracting the reaction which follows the use of jequiritol for pannus.

Coley has used the toxin of streptococcus and bacillus prodigiosis in cases of sarcoma of the antrum and orbit.

Santucci has reported good results in using the serum for sympathetic ophthalmia. E. S. T.

Blood Pigment Staining of the Cornea.

BUCHANAN, LESLIE (*The Ophthalmoscope*, April, 1912), states that blood pigment of the cornea is due to recurrent hemorrhages in the anterior chamber. Baumgarten first described the condition in 1883, and Lawford a few years later conducted his investigations on the histologic findings. Twenty-five or thirty cases have been reported.

The importance of the condition is twofold. From the clinical point of view it is necessary to distinguish the appearances to which this form of pigmentation gives rise from those arising from dislocation of an amber colored lens into the anterior chamber. From the point of view of prognosis it may be said that when the cornea presents this change in a marked degree there is probably a very serious alteration in the interior of the eye.

Five cases have come under the writer's immediate notice, two being seen only in the pathologic laboratory, the others having been watched clinically as well as examined histologically.

In all five cases there had been serious injury to the eye, such as a blow from a stone, a kick from a boot, a blow from a heavy stick, a puncture from a fork, and a blow from a hard rubber ball. In each case extensive recurrent hemorrhage into the anterior chamber had taken place, and owing to a long continued irritation of the eye, it was deemed advisable to remove the latter. The condition of the anterior of the globe, found on examination, varied somewhat, but in all it was clear that the correct treatment had been carried out, as it was hopeless to expect any good result to follow after such serious damage. Separation of the retina was found in three cases. Chronic cyclitis was present in the two others.

It may be accepted that the sequence of events is somewhat as follows: A quantity of blood having been liberated in the anterior chamber, clotting takes place and partial organization of the clot follows. The red corpuscles give up their hemoglobin, which is dissolved in the aqueous humor and carried

through the spaces of Fontana into the cornea. In the central area of the cornea the currents are slower than elsewhere, and in some manner the hemoglobin becomes altered and a body is formed which is much less soluble and therefore becomes deposited. This body may not be, and probably is not, always the same in chemical constitution. Thus E. T. Collins has shown that sometimes iron is not present, but that it is in a few cases. The chemical reactions are difficult to ascertain with exactitude, and spectroscopic examination does not give quite definite results, so that the precise nature of the substance which is deposited in the cornea is not clearly known, although in most instances it is probably hematoidin.

The author reports a case, male, aged 33, who was struck in the eye with a rubber ball. When first seen the eye was irritable, anterior chamber filled with blood, tension normal. After one month it was noticed that the central portion of the cornea was greenish in color. One month later tension $+1$, blood increased in amount. After another month the cornea became greenish amber in color. The blood filling one-third of the anterior chamber. Eye painful and tender. Eye enucleated. Sections of the cornea showed the pigmented area contained immense numbers of very small, highly refracting bodies, some elongated and some seemingly circular. It was seen that the granules varied widely in size, some being six or eight times larger than others. The granules stained poorly with any stain, but best with eosin. The largest granules were found in the anterior layers, the smallest in the central layers of the cornea. The elongated bodies were found scattered amongst the others, but in greater numbers in the anterior than in any other part of the cornea. Close examination showed that the pectinate ligament and the meshwork at the angle of the anterior chamber held a number of somewhat similar bodies. The posterior three or four lamellæ of the cornea were absolutely free from granules.

It is interesting to note that the spaces between the corneal lamellæ in and close to the area of cornea involved in the deposit contained a coagulated material, which had a somewhat gelatinous appearance, and which has not been described formerly.

The state of the iris is worthy of note in this case, there being a very distinct layer of newly formed fibrous tissue upon

its anterior surface, passing completely across the pupillary area.

In connection with this subject it is of interest to note that Fleischer published a paper in the *Münchener med. Wochenschrift*, 1909, S. 1120, which deals with the "peripheral brownish green corneal coloration." This peripheral coloration is found in certain general diseases, particularly cirrhosis of the liver, pancreatic disease, and certain forms of insular sclerosis of the brain and cord. Fleischer was of opinion that this pigmentation was hematochromic in origin. Histologic examination showed that the deposit was in the conjunctiva and in the membrane of Bowman, rather than in the corneal stroma. It is thus to be compared with the pigmentation of the skin in Addison's disease, rather than with that which is the subject of these notes.

W. R. P.

Sclerocorneal Trephining for Glaucoma Secondary to Cataract, and for Certain Other Conditions.

ELLIOTT, R. H. (*The Ophthalmoscope*, May, 1912). The operation of trephining was undertaken in fifty-two cases for the relief of glaucoma that had supervened as a secondary complication of cataract, and in fourteen cases for the reduction of staphyloma.

This form of glaucoma, comparatively rare in Europe, is all too common in India, for the simple reason that patients do not resort to surgical aid so freely, and the outpatient room records at the Madras hospital show its occurrence in nearly fifty cases yearly.

The average age of a hundred consecutive cases was 55.1 years, indicating that glaucoma, secondary to cataract, does not necessarily select advanced age. Statistics as to the duration of the cataract before glaucomatous symptoms supervened were difficult to obtain, but the number of cases in the series in which the history ranges from one to ten years was striking, showing, as a rule, glaucoma secondary to cataract was the result of neglect on the part of the patient to appeal to surgical interference until long after the cataract was fit for extraction.

Little could be expected in visual results pending the removal of the cataract. There was, however, slight improvement in vision in three cases. Schiötz tonometer readings showed that the tension was distinctly lowered in every case

at time of the patient leaving the hospital, after an average stay of fifteen days. Unfortunately, owing to the conditions existing in India, only eight of the fifty-two cases returned for extraction of the cataract, in spite of the efforts of the surgeons to induce them to do so.

It is unsafe to perform a trephining when the lens is fluid or semifluid, as there is a grave risk that the lens will present in the trephine hole, and stopping filtration loses the effect of the operation. In harder lenses trephining appears preferable to iridectomy.

In three cases trephining has been successfully performed for the relief of glaucoma supervening in an aphakic eye after the removal of cataract, and the tension reduced to normal.

Out of a series of 278 consecutive trephinings performed by the writer, 14 were for the reduction of staphyloma, ranging in age from below 20 to 49 years. In every case the staphyloma subsided with the fall in tension induced by the operation, and the patients went out distinctly improved. However, in staphylomatous cases there has probably always been chronic pericorneal inflammation. This is in most cases very likely to be associated with adhesion of the iris to the cornea; both these conditions are extremely unfavorable to the maintenance of a permanent and satisfactory result in trephined eyes, and one's prognosis as to the future must, therefore, be guarded. The results, however, have so far been sufficiently encouraging to make one persevere with the method of treatment.

W. R. P.

On the Site of Trephining for Glaucoma—Its Importance.

SMITH, E. TEMPLE (*The Ophthalmoscope*, May, 1912), has selected points of detail in the operation of trephining for glaucoma as performed in Elliot's clinic at the Government Ophthalmic Hospital in Madras, India.

From the anatomic consideration it is shown that to perform a cyclodialysis, which is one of the essential features of the Fergus operation, some part at least of the trephine hole must lie behind the attachment of the ciliary body, which, as is shown by diagram, lies behind the plane of filtration angle and the stroma of the iris root. Inasmuch as Fergus places his trephine hole as near the cornea as possible, it is assumed that the repositor does not effect a cyclodialysis.

Elliot has insisted that it is not only desirable, in the inter-

ests of safety, to open the tunics of the eye as far as possible in front of the ciliary region, but has devised a technic whereby a fistula may be obtained so far forward as to be semi-corneal in position, and has shown that it is possible to obtain permanent and satisfactory filtration by so doing.

It is essential that a portion of the trephined disc shall consist of clear corneal tissue—from one-fourth to three-fourths of its area. The site is exposed by stripping the conjunctiva by short snips with the scissors, not only up to the limbus, but sometimes from one to two millimeters beyond it. The conjunctival layer of the cornea, continuous with the bulbar conjunctiva, appears to strip along its natural place of cleavage. The distance that this can be done without buttonholing the flap needs to be seen to be believed.

The iris is dealt with only if it prolapses into the hole on the completion of trephining. This it appears to do in about 50 per cent of cases. A buttonhole iridectomy is made by snipping with fine scissors *in situ*. This is to prevent blocking of the wound, and for no other reason. Further experience may show that such an iridectomy is desirable in a majority of cases. The uveal tract, with this exception, is left severely alone.

In this connection, the conclusions reached by Weckers and Heuvelmans of Liege are interesting. They performed an experimental subconjunctival fistulization of the anterior chamber in rabbits, and found that after five months the tract was patent, microscopically as well as clinically. They summarized as follows:—“(1) The whole thickness of the sclera is to be excised, if a permanent fistula is to be obtained. (2) For several reasons the incision must be made as close to the cornea as possible. When the sclerectomy is made too far from the limbus, the loss of substance in the sclera may be obstructed by the ciliary body, which may prolapse.” Their conclusions thus support Elliot's main contentions.

That fistulization of the anterior chamber, which has every appearance of permanence, is demonstrable clinically at least twelve months after operation, the writer has satisfied himself by ocular evidence in Madras. And, since iridectomy is not eminently satisfactory in a large class of glaucomas, if the dictum at the head of this paper be accepted as axiomatic, Elliot's operation of keratosclerectomy with the trephine seems likely to become the operation of the future. W. R. P.

An Operation for Glaucoma.

MAYOU, M. STEPHEN (*The Ophthalmoscope*, May, 1912). The operation is designed to correct the fault common to most operations depending upon a filtration cicatrix, that of the wound healing firmly, stopping filtration through the cicatrix with resulting rise of tension.

The method of procedure is as follows: After the instillation of adrenalin, cocain, and eserine, a very large and thick conjunctival flap is turned forwards over the cornea and carefully dissected up to the limbus. An incision, about 3 mm. long is made from the outside into the anterior chamber, by gradually cutting through the fibers of the sclerotic with the knife point, starting 2 mm. behind the limbus.

A piece of black silk thread, 5 mm. long, having a knot at one end, is carefully sterilized and with a pair of forceps is laid across the incision in the sclera. With a narrow iris spatula, having a rounded notch in the end, the silk is tucked into the incision. As the silk is pushed forward into the anterior chamber, the knot sticks in the lips of the wound, whilst the free end passes forward into the angle of the anterior chamber. The conjunctival flap is then replaced in position, a stitch being inserted if necessary. The whole operation can be performed without emptying the anterior chamber, and is quite easy to execute.

The wound in the conjunctiva, after forty-eight hours, is usually firmly healed and the subconjunctival tissue is filled with fluid. At first this usually extends beyond the area of the conjunctival flap, but after a time it becomes more localized. The tension of the eye is usually subnormal from four days to a week, after which time it regains its normal tension. In none of the cases was there any iritis or undue reaction; the only contretemps was in one case, where there was a small prolapse of the iris at the time of operation. This was probably due to the fact that eserine had not been previously instilled, and that the incision was made rather larger than usual. Four cases are reported as successfully operated by the above method.

W. R. P.

The Reduction of Tension in Chronic Glaucoma.

ZORAB, ARTHUR (*The Ophthalmoscope*, May, 1912). An operation for the relief of tension is described, in which the

attempt is made to drain glaucomatous eyes by means of silk thread.

The following procedure was followed with success on four eyes: The eye is cocainized and cleansed in the usual way, eserine being used to contract the pupil. A large flap of conjunctiva is then raised off the globe, a crescentic attachment at the limbus being left. For choice, the flap should be taken from the upper part, which is generally covered by the lid. The whole thickness of the conjunctiva is taken, and as the limbus is neared, the conjunctiva here being thin, great care is taken not to make a "buttonhole." The flap is then reflected onto the cornea, and the globe being steadied by fixation forceps at the opposite side, an incision is made with a keratome into the anterior chamber.

The incision is about 3 mm. long, and begins about 2 mm. from the corneal margin. A small piece of sterile silk, not more than half an inch long, is doubled on itself and the bend placed against the lips of the wound in the sclera, the rest of the silk lying on the exposed sclera. As soon as the bend can be seen in the chamber the flap of conjunctiva is replaced, thus covering the distal portions of the silk. Great care is taken at this stage to see that the ends of the silk are well away from the margin of the conjunctival flap, it sometimes being necessary to cut off a small piece from each end. The flap is then stitched in a couple of places and the operation is complete.

The aftertreatment is very simple. The eye is bandaged for a couple of days, but the patient is up and about on the day after the operation. There is very free drainage for the first few days, the chamber being abolished, and the conjunctiva rendered very edematous by the aqueous. Within a week the chamber is reestablished, and the conjunctival condition improves rapidly. An appendix is added of ten eyes, four of which were operated by the above method, and six by similar procedure.

W. R. P.

The Blind and the Census of 1911.

ROCKLIFFE, W. C. (*British Medical Journal*, March 9, 1912), divides defects in vision into three classes: 1. No perception of light. 2. Those able to read ordinary test type, viz., 6/60; 3. Intermediate class, which includes (a) those who can count fingers. (b) those who can only perceive mov-

ing objects. He discusses these divisions from the economic standpoint, and then gives the cause of blindness in 590 cases enrolled on the books of the Hull Blind Institution, all of which he has personally examined.

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E. S. T.

Clinical Notes on a Case of Glaucoma Covering a Period of Thirty-seven Years.

MOULD, GEORGE T. (*The Ophthalmoscope*, May, 1912). A case of glaucoma is reported which was under observation for thirty-seven years. The patient, a female, aged 22 years, entered Moorfields, February 18, 1875, with a history of failing sight during previous twelve months, and a severe inflammation six months previous of the left eye. Tension plus, vision 6/60, almost total posterior synechiæ. R., V. — 6/6. Iridectomy was performed in O. S. The following year O. D. failed. V. — 6/12 and fine dots in lens, fundus and disc red. Iridectomy afterwards performed.

In 1905, O. D. showed some tendency to relapse, which was controlled with eserine, and three months later the tension was noted as normal in each eye. In January, 1912, R., V. with — 3.00 sph. = 6/9. L., V. = fingers at 1 m. R., anterior chamber rather shallower than left. Very clean coloboma, media clear, disc very slightly cupped; eye "full," but tension normal. L. anterior chamber deeper than right; coloboma not so clean; some shreds; media rather hazy; vitreous a lit-

tle turbid; disc a little cupped; fundus seen dimly; eye full; cystoid cicatrix to outer side, but there does not appear to be any leakage, as it is adherent and there is no subconjunctival edema when tested with a probe. No halos or lights seen; is kept on eserine.

The case is worthy of record because of length of time under observation, the complete recovery of right eye, notwithstanding some tendency to relapse about seven years ago, and remaining perfectly well for fifteen years after original attack.

W. R. P.

A Note on the Relation of Corneal and Absolute Astigmatism.

ROWAN, JOHN (*British Medical Journal*, January 13, 1912). reports 500 cases, or 1000 eyes, in which the astigmatism was measured, first, by the ophthalmometer of Javal and Schiötz, and then by retinoscopy, with atropin or homatropin cycloplegia. His results are as follows: Out of 1000 eyes examined, the total astigmatism and the corneal astigmatism were the same in 475 cases, that is, 47.5 per cent; 230 were hypermetropic; 353 showed compound hypermetropic astigmatism; 89 were myopic; 190 showed compound myopic astigmatism; and 138 mixed astigmatism. The divisions into the different classes were made by the actual figures made by retinoscopy.

E. S. T.

The Ophthalmoreaction in the Diagnosis of Chronic Pulmonary Tuberculosis.

MACNALT, A. SALISBURY (*British Medical Journal*, December 2, 1911). This paper is a report of the results of the Calmette test in 52 cases. His conclusions are: 1. A negative result by no means excludes pulmonary tuberculosis. 2. A positive result cannot be held to be diagnostic of tuberculosis. 3. The ophthalmoreaction appears to be an adjunct to the diagnosis of pulmonary tuberculosis.

E. S. T.

The Use of Color Tests in Medical and Surgical Practice.

BEAUMONT, W. M. (*British Medical Journal*, January 13, 1912). This paper is a very interesting essay upon the advantages of careful color testing, with the detailed résumé of the practical working of careful color testing and a brief reference to the well known clinical aspects of color blindness. He enthusiastically endorses the lantern of Dr. Edridge-Green.

E. S. T.

ABSTRACTS FROM GERMAN OPHTHALMIC LITERATURE.

BY

WILLIAM ZENTMAYER, M. D.,

PHILADELPHIA.

ALBERT C. SAUTTER, M. D.,

PHILADELPHIA.

FREDERICK KRAUSS, M. D.,

PHILADELPHIA.

AND

WALDEMAR E. FISCHER, M. D.,

ST. LOUIS.

Concerning the Cystein Reaction of Normal and Pathologic Lenses.

REIS, W., Lemberg (*Graefe's Archiv. f. Ophth.*, Vol. 80. Part 3). Arnold's investigations have shown that of the bodies composing the albumin molecule, cystein alone gives the characteristic sodium nitroprusside reaction. It is a constant and important constituent of every functionally active animal cell, especially prevalent where active metabolism exists. (Liver.)

Studies by Reis of the cystein reaction in human and animal lenses showed:

1. An especially marked reaction in normal human and animal lenses.
2. A reaction which remained pronounced for some time after extraction.
3. No difference in the degree of reaction under normal conditions between the peripheral and central lenticular layers.
4. A positive cystein reaction in animal lenses removed from eyes fixed in formalin.

5. A negative reaction in hypermature and mature senile cataract. In incipient cases always a negative reaction of the nucleus, the reaction of the cortex depending upon the degree of maturity.

6. The reaction in senile cataract not influenced by the age of the patient.

7. A positive reaction in traumatic cataract.

While more observations are required before any definite conclusions can be drawn, it is possible, the writer thinks, that this insufficiency of cystein bodies in the cataractous elements of the lens may be due to a fatty degeneration of the lens fibers, fatty tissue giving a negative reaction. A negative reaction likewise occurs in a fatty degenerated liver, an organ normally rich in cystein bodies.

The finding of a positive reaction in traumatic cataract seems to bear out Michel's assertion that in traumatic cataract normal albuminous bodies are present. A. C. S.

How Can Satisfactory Frontooccipital X-ray Pictures of the Inferior Portion of the Orbit Be Obtained?

LANGENHAN AND WAETZOLD, Berlin (*Graefe's Archiv. f. Ophth.*, Vol 81, Part 1), find that with patient in the prone position and the head turned backwards so that the German horizontal plane (a plane passing through the most dependent points of both orbital margins and the highest points of both external auditory openings) lies 15 degrees from the perpendicular, the X-ray picture of the orbit will not be obscured by the shadow of the petrous portion of the temporal bone. X-ray photographs of the head in this position show the shadow of the petrous bone displaced from the orbit, thus permitting a more satisfactory study of the bony orbital walls. A. C. S.

The Question of Passage of Antibodies Into the Fluid of the Anterior Chamber of the Operated Eye.

SCHIRKOWSKY, T. W. Kasan (*Klin. Monatsbl. f. Augenheilk.*, February, 1912), has found by experiments upon the eyes of rabbits that for several months after the operation for extraction of the lens there is a marked presence of antibodies in the operated eye and also to a lesser degree in that of the fellow eye. There is also a marked increase of the agglutinins in the aphakic eye, which remains long after the eye has been quieted down. F. K.

Investigations Concerning Encapsulation (Latency) of Bacteria in the Injured Eye.

MARX, Rotterdam (*Graefe's Archiv. f. Ophth.*, Vol. 80, Part 3), concludes as the result of his experimental investigations that after a traumatism living microorganisms capable of propagation may reside in an eye many months, irrespective of the external aspect, the tension, presence or absence of a foreign body which may be encapsulated or freely movable, irrespective of a previous mild or grave inflammation, or whether the eye is blind or seeing. A. C. S.

Further Experimental Contribution Concerning the Pathogenesis of Choked Disc.

LEVINSOHN, Berlin (*Graefe's Archiv. f. Ophth.*, Vol. 81, Part 1). The writer's experimental studies (subdural injection of colored normal salt solution with puncture of the anterior chamber of the eye on the same side, etc.) tend to disprove Schieck's theory (a modification of his own) concerning the pathogenesis of choked disc, a theory attributing the papilledema to compression of the cerebrospinal fluid into the axial lymph bundle.

Levinsohn's findings indicate that the congestion in the nerve head is the result of pressure of the cerebrospinal fluid upon the perivascular lymph spaces of the central vessels within the intervaginal space, the increased pressure impeding the outflow of intraocular fluid at this point. Levinsohn regards as additional evidence in favor of his theory Schieck's valuable pathologic studies which show a congestion of the perivascular lymph sheaths of the central vessels as the only pathologic finding in the incipient stage of choked disc. A. C. S.

Experimental Investigations Regarding the Permeability of the Transparent Ocular Media for the Ultrared Rays of Artificial Illuminants.

VOGT, Aarau (*Graefe's Archiv. f. Ophth.*, Vol. 81, Part 1), arrives at the following conclusions:

1. The ocular media are penetrated by only such dark (ultrared) rays which emanate from white, incandescent bodies. The dark rays emanating from red glowing bodies only partially penetrate the media; those from bodies under red glow do not penetrate at all.

2. The ultrared rays of electric light reach the retina in much larger numbers than the visible rays.

3. Only by very thick layers of water is it possible to absorb the ultrared rays which penetrate the ocular media. For these rays the water is almost colorless. The dazzling experiments hitherto performed which intended injury of the lens or retina by visible rays need revision, for, according to the method of investigation of artificial illuminants, more ultrared than visible rays reached the retina.

The macular disturbances occasioned by solar rays can be attributed just as well to the numerous ultrared rays which reach the retina.

4. Inasmuch as artificial illuminants, especially electric light, emit more heat rays and more heat rays which reach the lens and retina than natural light, the question arises whether certain external and internal ocular affections are not caused and furthered by such rays.

5. Of all rays the ultrared rays play the most important rôle in the etiology of glass blowers' cataract, for they reach the lens in greater numbers, are most numerous at the posterior axial portion of the lens where cataractous changes first appear, and are more easily absorbed by the lens than by the other ocular media.

6. His experiments show that Bruecke's and Helmholtz's conception regarding the ultrared and red boundaries as the limit of perception to coincide with the limit of diathermancy as no longer tenable.

A. C. S.

Pigment Studies in the Living Eye. Conjunctiva, Cornea, and Iris.

AUGSTEIN, CARL, Bramberg (*Klin. Monatsbl. f. Augenheilk.*, January, 1912), studied various pigmentation in the conjunctiva, cornea and iris of the living eye, and concludes that the pigmentations of the anterior portion of the eyeball, usually regarded as congenital, are really developed in the first year of life. Those seen in the episcleral tissues are usually secondary to trauma. Pigmentation is independent of the concurrence of blood extravasation and pigment epithelium. After inflammation of the uveal tract an increase of the pigmentation can be noted, sometimes forming a pigmented new growth. A passage of the pigment from the interior deposits to the exterior of the eye is not infrequent. After

continued use of miotics, a pigment deposit on Descemet's membrane is afterwards found, and occasionally a wandering of pigment through the cornea. Melanosis of the cornea is not directly connected in any way with persistent pupillary membrane. F. K.

Atypical Iris Colobomata and Other Ocular Malformations.

ROESSLER, Vienna (*Graefe's Archiv. f. Ophth.*, Vol. 80, Part 2), publishes the findings in five cases—1, coloboma up and in; 2, large colobomata with defects in the anterior layer; 3, microphthalmus coloboma up; 4, bridge coloboma and ectopia lentis down; 5, superficial bridge coloboma. A. C. S.

Congenital Total Cataract and Retinal Anomalies.

GILBERT, Munich (*Graefe's Archiv. f. Ophth.*, Vol. 81, Part 1), publishes the pathologic findings in an eye removed from a 6½ months old infant.

Soon after birth the parents noticed a grayish reflex from both pupils. When examined by the writer bilateral total cataract was found. Several days after a discission on one eye, the child succumbed to nutritional disturbances.

The unoperated eye, which was slightly microphthalmic, was removed; pathologic examination disclosing total cataract, defect in the posterior capsule, remains of the embryonal vascular system, and a curious developmental anomaly in the retina near the ora serrata.

Regarding the etiology of the cataractous changes, he mentions as possible causative factors ruptures of the capsule (Hess), due to persistence of the membranous capsule of the lens or to traction by abnormal mesodermal bands. (v. Hippel.)

The retinal changes included proliferation of the cells of the internal nuclear layer, partial proliferation of the innermost retinal layers, especially the internal plexiform layer, defects in the internal limiting membrane, vascular and connective tissue bands penetrating the inner layers of the retina. Seefelder found similar anomalies in otherwise normal fetal eyes. These he described as duplications, rosette formations and nodular cellular proliferations, and their resemblance to glioma made him consider them possible aboriginal

forms of glioma. Gilbert believes this a plausible supposition.

In his own case, however, he is more inclined to consider the retinal changes the result of persistence of the embryonal vascular system and of traction by vascular and connective tissue bands.

A. C. S.

The Presence of True Weichsellbaum Meningococcus on the Human Conjunctiva.

VERDERAME, PH., Freiburg in Br. (*Klin. Monatsbl. f. Augenheilk.*, February, 1912), reports the presence of true meningococcus of Weichsellbaum in the conjunctiva of a healthy forty-year-old man, who came to the clinic for glasses. He presented a slightly reddened palpebral conjunctiva with slightly increased mucous secretion. The culture and agglutinin tests were positive. There was no history of contact with any case of meningitis.

F. K.

Keratitis Dendritica After Traumatism in a Case of Antral Suppuration.

BIRKHAUSER, R., Basel (*Klin. Monatsbl. f. Augenheilk.*, January, 1912), reports the case of a sixteen-year-old boy, who was struck in his right eye by a piece of brass. The cornea showed a number of roundish gray white areas about the pupillary area. Fluorescein disclosed a dendritic appearance of the cornea. Under atropin and dionin salve in the morning and scarlet red salve (4 per cent) at night, the condition, instead of clearing, as it usually does, showed further progress. Frequent canterizations were of temporary benefit. After several weeks, healing took place with normal vision. A recurrence of inflammation shortly after returning to work proved to be due to a small piece of brass which had entered the anesthetic cornea without the patient's knowledge. The cornea assumed the appearance of keratitis dendritica. An examination then disclosed a suppurative condition of the antrum, which yielded very rapidly to washing after exploratory puncture. The sensibility of the cornea was reestablished in three days. The author believes that the persistent keratitis dendritica and anesthesia of the cornea were due to antral disease, and that the trauma acted as the direct excitant.

F. K.

On Cystoid Conjunctival Formations Following Staphyloma Excision.

BOER, Halle (*Gräfe's Archiv. f. Ophth.*, Vol. 81, Part 1), publishes the histologic findings in a case. An operation for staphyloma had been performed three years previously, after which there developed a cystic, yellowish red tumor 12x14x18 mm. Two similar cases have been reported by Kroll and Possek.

With Possek he attributes these formations to folding of the conjunctiva at the time of operation. A. C. S.

The Relationship Between Parenchymatous Keratitis Due to Trauma and Accident Insurance.

WICHERKIEWICZ, B., Krakau (*Klin. Monatsbl. f. Augenheilk.*, January, 1912), recites several cases of parenchymatous keratitis occurring in patients predisposed to syphilis and tuberculosis, in whom there had been a traumatism immediately preceding the affection. He believes that the second eye becomes affected sympathetically. The insurance companies should be held liable for a partial indemnity, though much injustice is possible by the evilly disposed individual.

F. K.

A Characteristic Form of Retinal Degeneration Due to Multiple Miliary Aneurisms.

LEFFER, TH., Heidelberg (*Gräfe's Archiv. f. Ophth.*, Vol. 81, Part 1), describes a form of retinal degeneration associated with miliary aneurisms, the degeneration probably being secondary to disease of the retinal arterioles.

He refers to eleven cases from the literature (Pergens, Oeller, Fisher, Story and Benson, Doyne, Schieck, Coats, Krauss and Brueckner, Feilchenfeld, Guzmán, Morton), cases reported as "Plastic Exudative Choroiditis," "An Unusual Disease of the Retina," "A Contribution to Tuberculous Fundus Disease," etc., and two personal observations. While a few of these cases somewhat resemble Coats' cases of "Retinal Disease with Massive Exudation," he considers the affection characteristic enough to deserve separate consideration.

Ophthalmoscopic Signs.—The disc and larger vessels are generally normal. The opaque retinal infiltration, usually behind the vessels, in character and distribution resembles

that observed in retinitis circinata. There may be a small pigmented macular lesion surrounded by a ring shaped zone of infiltration, or the macula may be included in an extensive infiltration. The circle may be broken in several places or the infiltration may be triangular with the apex at the macula, or the degeneration may be chiefly below the macula. A very broad zone of degeneration may be observed.

The aneurisms resemble berries on a stalk, or are included in the course of the vessel. Veins are rarely affected. When hemorrhages occur they usually are small. There may be obliterated vessels. The occurrence of aneurisms only in the diseased portions of the retina shows that the degeneration is secondary to a disturbance of nutrition because of disease of the arterioles.

In advanced cases there is almost always detachment of the retina. The affection usually runs a chronic course, and vision is seriously impaired.

It was found in males only, between the thirteenth and twenty-sixth years; retinitis circinata, on the other hand, generally occurring in elderly females.

In concluding, the writer discusses the pathology of miliary aneurisms. In the only case (Morton) studied anatomically by Coats, no tuberculous changes were manifest.

The production of miliary aneurisms by multiple small emboli originating from a latent endocarditis is a possibility; however, further studies, especially in early cases, are necessary to clear up this point.

A. C. S.

Concerning Cystoid Degeneration of the Retina.

OGUCHI, Tokio (*Graefc's Archiv. f. Ophth.*, Vol. 80, Part 3), publishes the histologic findings in a case of scleral rupture the result of blunt traumatism.

There was uveitis and cavity formation at the posterior pole, the cystoid degeneration being produced by inflammatory exudate between pigment epithelium and rod layer. This exudate (probably of choroidal origin—choroiditis exudativa) not only filled the vitreous chamber, but also the fissured hollow space in the internuclear layer and several spaces in the internal nuclear and nerve fiber layers. Anatomic study indicated that the cavity formation was caused not alone by separation of tissues by exudate, but also by disappearance of the nuclei,

due to a cytotoxin contained in the exudate. In conclusion he refers to the relationship between this affection and hole formation at the macula lutea.

A. C. S.

Contribution to the Knowledge of Retinal Cyst Formation and Papillitis After Inflammation of the Anterior Ocular Segment.

INOUE, Tokio. Leipzig (*Graefe's Archiv. f. Ophth.*, Vol. 81, Part 1), reviews the literature and publishes the clinical and pathologic findings in four cases.

In three cases the cyst formation was limited entirely to the macula and its immediate vicinity, and in only one case did it extend to the equatorial region. In every case the internal nuclear layer, Henle's fiber layer, and the external plexiform layer were the layers particularly involved. The spaces contained coagulated fluid. There were few signs of degeneration. In every case there were inflammatory changes of a chronic insidious character in the anterior segment associated with choroidal changes in two of the cases. In three cases the inflammation was subsequent to perforating traumatism. X-ray treatment, and probable old perforation from corneal ulcer; in the other case the etiology being unknown. In two cases there were sclerotic changes of the large retinal vessels and vacuolar degeneration of the intima, respectively. The age of the patients ranged from ten to forty-six years.

From a study of these cases he concludes that the cyst formation is not due to tissue degeneration primarily, but to an edema induced generally by inflammation in the anterior segment, or perhaps occasionally by vascular changes. The coexistence of choked disc in one case would seem to support Collins' view, attributing the retinal changes to pressure edema. However, Inoue prefers to consider this an example of choked disc following a perforating traumatism (traumatic or perforative choked disc, Hirschberg, Fehr, Stock, Knapp, etc.), the choked disc in these cases being generally ascribed to toxins formed in the anterior ocular portions. He cites three similar cases of papillitis. While the toxins reach the nerve by preformed or natural drainage channels, the macular lesions must be ascribed to a pathologic condition of the vitreous and to the vulnerability of the macular cells. A close genetic relationship between papillitis and cyst formation, therefore, exists under these conditions.

A study of one case in particular shows that macular hole formation may be the ultimate result of cystic or edematous degeneration of the macula. A. C. S.

On the Question of the Treatment of Retinal Detachment by Injection of Air Into the Vitreous.

KRUSIUS, Berlin (*Graefe's Archiv. f. Ophth.*, Vol. 80, Part 2), after referring to recent articles by Ohm and Birch-Hirschfeld in *Graefe's Archives*, publishes the results of his experimental investigations. He studied rabbits' eyes in which retinal detachment had been produced by suction of vitreous. (Birch-Hirschfeld.) He subsequently inserted a trocar canula through the subretinal fluid and retina into the vitreous and injected air. This caused an increase of intraocular pressure, forcing the retina back into place, the subretinal fluid regurgitating through the puncture hole or through a rent in the retina. Ohm aspirated the subretinal fluid. The quantity of air necessary was about .5 cc., more than this causing pathologic increase of pressure, shown by resulting cloudiness of the cornea.

In eight cases a permanent attachment (four weeks) occurred only once, due probably to the rapid absorption of the injected air and to the elasticity of the adhesions and vitreous bands.

In spite of the apparent harmlessness of the procedure, he advises against its application in the human eye until further observations on animal eyes have proved its value.

A. C. S.

Concerning Essential Hemeralopia With Diffuse Grayish White Coloration of the Fundus.

OGUCHI, Tokio (*Graefe's Archiv. f. Ophth.*, Vol. 81, Part 1), reports the clinical histories of three cases in which the symptoms closely resembled those of retinitis punctata albescens, or rather that form of retinitis punctata albescens in which hemeralopia is the only functional disturbance. Instead of isolated whitish specks, however, a diffuse grayish white coloration of the fundus was observed. Two were of consanguineous parentage.

Regarding the ophthalmoscopic picture in these cases he claims:

1. The fundus may show a complete or partial grayish white

coloration of variable intensity; the most careful search failing to reveal pigment spots or white specks.

2. The papilla and vessels are absolutely normal. In contrast to the grayish white fundus, however, they appear very dark and prominent.

3. The macula lutea likewise appears abnormally dark by contrast, and the macular vessels unusually distinct.

This appearance could be brought about, he thinks, by the presence of a thin layer of connective tissue between the retina and choroid, or by approximation of whitish specks, but since no anatomic study has ever been made, it is best to consider the affection apart from other diseases.

Excepting Komoto's case, he was not able to find any other cases in the literature.

A. C. S.

A Contribution to the Pathology of Pigment Degeneration of the Retina.

SUGANUMA, S., Niigat, Japan (*Klin. Monatsbl. f. Augenheilk.*, February, 1912), had an opportunity to study microscopically an eye suffering from retinitis pigmentosa, removed shortly after death. He found progressive sclerosis of the retinal blood vessels, atrophy of the nerve elements, pigment infiltration of the retina, hyperplasia of the supporting tissues, and slight atrophy of the choroid, with no evidence anywhere of inflammation. He concludes that retinitis pigmentosa is a true disease of the retina and not caused by a circulatory disturbance of the choroid. The nerve destruction and the sclerosis of the retinal vessels are due to the same cause. The pigment infiltration of the retina is a secondary appearance, caused mainly by a growth of exuberant pigment cells into the pathologically widened tissue and perivascular lymph spaces.

F. K.

A Contribution to the Pathologic Anatomy of Retinitis Cacheticorum ex Carcinoma Ventriculi.

NAKAIZUMI, Y., Tokio, Japan (*Klin. Monatsbl. f. Augenheilk.*, March, 1912), examined microscopically the eyes of a fifty-six-year-old man dying of carcinoma of the pylorus with metastasis in the peritoneum and liver. Macroscopically the eyes showed small hemorrhages and fatty white spots in the retina. The author concludes from his studies that retinal changes occur in carcinoma cachexia as in other severe per-

nicious anemias. These changes consist of hemorrhages and white spots without definite formation or localization. The hemorrhages are located in the nerve fiber layer. The white spots consist of a varicose hypertrophy of the sheathless nerves in the nerve fiber layer of the retina and of the presence of fatty substances. The glistening appearance is caused by the presence of the fat. The so-called varicose hypertrophy of the nerve fiber is really due to inanition, and is a degenerative change. The author suggests the name of varicose swelling of the axis cylinder for this condition. F. K.

Three Cases of Glaucoma Treated by the Elliot Method of Trephining.

KAYSER, B., Stuttgart (*Klin. Monatsbl. f. Augenheilk.*, February, 1912), reports three cases of glaucoma in which he secured permanent reduction of the tension by this operation. He performs the operation in the usual way, abscising in a radiating direction any prolapse of the iris presenting in the wound. F. K.

Concerning the Pathogenesis of Sympathetic Ophthalmia—Part 3.

DEUTSCHMANN, F., Hamburg (*Graefe's Archiv. f. Ophth.*, Vol. 81, Part 1), summarizes the results of his experimental investigations as follows:

1. By inoculation of choroidal tissue from human eyes with sympathetic disease into rabbits' and monkeys' eyes it was possible to produce true sympathetic ophthalmia.

2. He believes the causative agent to be a Gram positive diplococcus which may be a modified sarcina.

3. Disease of the second eye occurs by the emigration of bacteria from the first eye to the lymph sheaths of the optic nerve, to the chiasm and finally to the lymph sheaths of the optic nerve of the fellow eye.

4. The bacteria may take one of two courses: either directly from the choroid to the intervaginal space, or from the eye with the anterior ciliary vessels to within the orbital musculature to the posterior pole and thence to the optic nerve sheaths, or vice versa.

5. The chronic inflammation of the meninges is circumscribed and does not cause general symptoms. A. C. S.

Concerning Double Perforation of the Globe by the Modern Small Caliber-Mantel Projectile.

OGUCHI, Tokio (*Graefe's Archiv. f. Ophth.*, Vol. 80, Part 2), reports a case of this kind in a Japanese soldier wounded in the Mukden battle.

The bullet wound extended from the root of the nose to the left temporal region, and though the left globe was included in the wound path no gross traumatism occurred. The clinical signs comprised intraocular hemorrhage, impaired motility, amaurosis, conjunctival chemosis, slight inflammatory reaction, but no change in the external aspect of the eyeball.

Twenty-two days later the eyeball was enucleated and prepared for microscopic study. Anatomic examination disclosed the entrance wound at the nasal equator and the larger exit wound somewhat behind the lateral equator. Cicatrization had already begun.

The case shows that the modern small caliber projectile may under certain conditions cause double perforation of the globe without associated gross ocular destruction. A. C. S.

A Case of Primary Tumor in the Optic Nerve.

KOYANGI, Kyoto, Japan (*Klin. Monatsbl. f. Augenheilk.*, March, 1912), removed the eye from a thirteen-year-old girl on account of great exophthalmos, which had existed for one and one-half years. The tumor was spindle shaped and separated by a small isthmus from contact with the eyeball, and extended nearly to the optic foramen. From the microscopic examination the author concludes that the growth was a glioma. F. K.

**Studies Concerning Optic Nerve and Retinal Affections.
Concerning the Question of Spontaneous Cure
in Glioma of the Retina.**

DE KLEIJN Utrecht, (*Graefe's Archiv. f. Ophth.*, Vol. 80, Part 2), cites a case in which enucleation was performed at the age of six weeks for glioma retinae, the diagnosis being substantiated by histologic examination.

Four months later the child was brought to the clinic with a tumor in the other eye, the clinical diagnosis being glioma retinae. Because of the absence of inflammatory symptoms enucleation was deferred. The child was not brought back

for further examination. Four years later the case came under observation again. The left eyeball was now blind and atrophic; there was no recurrence in the right orbit. In view of the possibility of recurrence in the left eye the eyeball was enucleated.

Microscopic study disclosed an eye filled with bony and calcified tissue enclosing necrotic areas surrounded by layers of small cells, the cells which had escaped necrosis. The picture suggested glioma. Greeff, Leber, Straub and Wintersteiner, to whom the sections were submitted, concurred in the diagnosis. More time will have to elapse before recording this as an example of spontaneous cure, however. A. C. S.

Pseudotumor of the Iris in a Child.

GINSBERG AND COHN, Berlin (*Gräfe's Archiv. f. Ophth.*, Vol. 81, Part 1). Following a severe attack of measles at eleven months there occurred a protracted inflammation of the right eye with ensuing visual impairment and decrease in size of the eye. At two years of age optical iridectomy. No symptoms until two and one-half years later, when the mother noticed a growth in the anterior portion of the eye. Examination disclosed a yellowish red, vascularized tumor in the anterior chamber near the coloboma. The anterior chamber contained many cholesterin crystals. The tension was lowered, the eye quiet and slightly under the normal size. Pathologic diagnosis—iridocyclochoroiditis with detachment of the retina. They attribute the crystals to regressive changes in the hemorrhagic and cellular exudates. A. C. S.

Voluntary Exophthalmos in a Case of Dermoid Cyst of the Orbit.

BARRIERE, A. V., Montevideo, Uruguay (*Klin. Monatsbl. f. Augenheilk.*, March, 1912), reports a case of voluntary exophthalmos occurring in a nineteen-year-old farmer, which had been present since birth. This condition gradually increased, and for one year caused diplopia whenever the patient used his jaw muscles. On examining the patient an exophthalmos of 5 mm. in the right eye was apparent, with limited motion externally, showing no apparent tumor. When the patient compresses his jaw muscles, the eye shoots out $2\frac{1}{2}$ mm. more, causing a homonymous diplopia, also showing a

tumor like projection of the outer half of the lower lid and outer canthus. A tumor mass of elastic consistency could then be felt in the orbit, which disappeared when the chewing process ceased. Puncture showed a cyst containing a glycerin like fluid. The cyst was removed by the Kroenlein method with cure of the condition. F. K.

Indicanuria in Ocular Disease.

V. HIPPEL, Halle (*Graefe's Archiv. f. Ophth.*, Vol. 81, Part 1), on examining 416 cases of ocular disease for indicanuria found positive findings in only sixteen. Only those cases were considered positive in which the blue iron chlorid reaction was unmistakable.

The different results obtained by other investigators may possibly be attributable to faulty technic. Thus Colombo found almost 100 per cent indicanuria in phlyctenular keratoconjunctivitis.

It should be remembered that indican is a constituent of normal urine, but that the amount is generally so small that it is seldom difficult to differentiate a physiologic indicanuria.

He concludes that indicanuria in ocular disease, concerning which Elschinig has written extensively, has no etiologic significance. A. C. S.

Is the So-called Gastrointestinal Autointoxication (Indicanuria) a Frequent Cause of Ocular Disease?

STUELP, Muelheim (*Graefe's Archiv. f. Ophth.*, Vol. 80, Part 3), publishes his views based on extended clinical observations. He concludes that indicanuria may perhaps in rare instances precipitate or hasten the manifestation of an ocular affection directly due to other causes, but only in cases in which a marked and continuous indican excretion is demonstrable.

He does not consider it justifiable to attribute an ocular affection in association with intestinal derangements and the accompanying urinary findings solely to intestinal autointoxication unless every other possible cause has been excluded.

He cannot support Elschinig's view, that in the majority of cases tuberculosis and syphilis are only factors predisposing to autointoxication, the real causative factor. Thus in 160 cases of tuberculosis Stuelp found indicanuria in only three cases.

While a local predisposition or a general diathesis (disease preparedness) must be conceded, since only a minority of tuberculous, syphilitic, rheumatic, etc., patients succumb to ocular disease, this hypothetic general derangement should not be designated gastrointestinal autointoxication. A wide gap exists between hypothesis and generalities and a definite, scientifically founded disease picture. And in a given case it would certainly not be rational therapy to treat only the supposed metabolic disturbance or constitutional anomaly and to neglect specific treatment of the underlying constitutional disease.

A. C. S.

The Use of Salvarsan in Syphilitic Ocular Disease With Report of Favorably Influenced Cases of Muscle Palsies.

WEIGMAN, E., Hildesheim (*Klin. Monatsbl. f. Augenheilk.*, February, 1912), reviews the literature and cases reported since the publication of the analysis by Stuelp, and reports four cases of palsy of ocular muscles which were greatly benefited by the use of salvarsan.

F. K.

Eserin and Atropin in Diseases of the Cornea.

KAZ, R., St. Petersburg (*Klin. Monatsbl. f. Augenheilk.*, March, 1912), is firmly of the belief that corneal ulceration resisting the atropin treatment will quickly yield to the use of eserin, used in the form of eserin-xeroform mixture. He thinks that atropin should only be used when there is involvement of the iris, and even then it should be used in conjunction with the eserin. The mixture suggested consists of eserin 0.01, xeroform 0.06, vaselin fl. 2 to 3 gramme.

F. K.

The Fate of the Cartilaginous Ear Flap Used in Plastic Lid Operations.

KUMAGAI, Tokio (*Klin. Monatsbl. f. Augenheilk.*, February, 1912). The great benefit derived from the use of the cartilage from the ear in the formation of the new lid after extirpation for cancer makes the fate of the transplanted cartilage of interest. Kumagai found a marked degeneration and absorption of the cartilage, the only remaining portion having the appearance of scar tissue five months after the operation. He believes that the cartilaginous cells were changed by vacuolization of the protoplasm and hyaline degeneration of the intra-

cellular portions. A second change noted was the penetration of new connective tissue cells into the degenerating cartilage. This appearance is not encouraging in regard to the final results from the operation. F. K.

A New Method of Correcting Unilateral Aphakia with Glasses.

HEGNER, C. A., Jena (*Klin. Monatsbl. f. Augenheilk.*, March, 1912). The diplopia resulting from the use of a high plus lens in the aphakic eye when the fellow eye is emmetropic is a source of great annoyance to the patient. Hegner suggests the use of a spectacle shaped somewhat like a short telescope before each eye, in which several lenses of different density and curvature are used before the defective eye, and plane lenses before the emmetropic eye. The glasses are mounted in an aluminum tube, 1.5 cm. broad. Lateral vision is greatly curtailed by this method, but the restoration of binocular vision repays for this discomfort. This method is also applicable to cases of anisometropia and high myopia. F. K.

ABSTRACTS FROM FRENCH OPHTHALMIC LITERATURE.

BY

M. W. FREDERICK, M. D.,

SAN FRANCISCO.

AND

JESSE S. WYLER, M. D.,

CINCINNATI.

Concerning the Choice of a Method of Blepharoplasty.

ROLLET (Du choix d'un procédé blepharoplastie, *Revue Générale d'Ophthal.*, 1912, No. 2, p. 4) says that all cases may be divided into two large divisions: (1) Treatment of cicatricial ectropion, (2) removal of a palpebral cancer.

The first division is subdivided into those cases where there is great cicatricial contraction and induration, following heat or chemical burns; and secondly, the complicated injuries where skin and subjacent bone are missing, as occurred in a man after a gun explosion. The former cases indicate the blepharoplasty with two or four pedunculated flaps from both nasal and malar sides. The latter are remedied by the modified Italian method of implanting skin and all the subcutaneous tissue into the defect.

The second division deals with (1) cancer of the lids and margins, (2) where the infiltration has penetrated the orbit. The author describes case of first type cured by means of a sliding flap, where the entire lower lid margin was involved, and advises the joining of the lids when the orbit is cleaned out in the severer conditions.

J. S. W.

Experimental Researches Upon Ocular Infections of Gonorrheal Origin.

ROLLET AND AURAND (Recherches experimentalis sur les infections oculaires par le gonocoque, *Revue Générale d'Ophthal.*, 1912, No. 3) inoculated two sets of rabbits—the one

with a pure culture of the gonococcus, the other group with a pure toxin. The injections were made into the anterior chamber, iris, ciliary body, vitreous and optic nerve. The following conclusions are gained from the results:

1. The gonococcus is pathogenic for the rabbits under certain conditions, as is also the toxin.

2. The gonococcus affects the uveal tract and produces an exudation in the anterior chamber, even a hypopyon and opacities of the vitreous.

3. The gonococcus appears to have a selective toxic action upon the nerve cells of the retina and optic nerve.

4. The lesions appear to be due more to the toxin than the bacteria themselves, for the microorganisms are never recovered in any of the eyes inoculated.

5. The spontaneous recovery on the part of the anterior segments of the eyes inoculated is constant in rabbits, due probably to the high prevailing blood heat.

6. Certain injections were followed by distal lesions (intestinal gangrene, abscesses and suppuration) with cachexia and death through general intoxication.

J. S. W.

Syphilitic Chancres of the Lid and Chin.

ROLLET AND GENET (Chancre syphilitique de la paupière et du menton, *Revue Générale d'Ophthal.*, April, 1912) describe the case of a man twenty-two years of age, no hereditary taint, with two chancres of the face. The one on the lower left lid embraced practically that entire structure. The other was situated at the outer angle of the mouth, not involving the mucous membrane, oval in shape and about 25x14 mm. The glands were swollen so that some were visible upon inspection. Date of contamination was not obtainable, but seemed to have taken place through acne pustules. Next day a roseolar eruption appeared and the "treponema pallidum" was isolated. The patient received 0.5 gm. arsenobenzol, and twelve days later a similar dose. Two weeks after, the chancres had cicatrized and the roseola disappeared.

The observation is absolutely classic as to the course of the disease and is cited to remark upon accidental initial lesions.

The first case of the infection of the lids is a rather recent report. About one case in twenty-five of syphilis is due to an extragenital primary lesion, so the chance of the lid becoming

affected is very small. This case by having two points of entry upon the face is also noteworthy. Both improved simultaneously under treatment and were healed in fifteen days. The arsenobenzol was given by rectum, dissolved in 300.0 grains of artificial serum to which was added twelve drops of laudanum, and introduced high up by means of a soft catheter. The injections were twelve days apart.

The authors do not consider syphilis with the chancres on the face as severe as infection at other points. J. S. W.

A Cyst of the Iris Treated by Electrolysis.

POISSONIER, Amiens (Un cas de kyste de l'iris traité par l'électrolyse, *La Clinique Ophthalmologique*, Vol. XVII, December, 1911, p. 646), made use of the electrolytic procedure which was communicated to him by Thilliez of Lille at the Congress of Ophthalmology in Paris in 1908. The patient, a woman, had received a blow in the eye, from which there was no immediate trouble. Eighteen months later pain and photophobia set in, which were not diminished by treatment. In the lower part of the iris, and pushing it backwards, was a small, translucent tumor of the size of a pea. With a small irido-platinum needle attached to the positive pole the tumor was transixed and a current of four milliamperes passed for two minutes. The cyst emptied itself, and the iris returned to its normal position. The next day the pain had disappeared, and the iris was normal. Atropin was prescribed. A week later the pain was still absent, the upper part of the pupil dilated, less in the lower part. Three months later the condition was still the same. M. W. F.

The Symptomatic Value of Corkscrew Vessels of the Retina.

DOR, Lyon (La valeur séméiologique de l'état hélicoïdal des vaisseaux rétiens, *La Clinique Ophthalmologique*, Vol. XVII, December, 1911, p. 620), suggests that the corkscrewing of the retinal vessels may not be simply a local congenital anomaly, but may be an acquired anomaly indicative of an exaggerated tortuosity of the vessels throughout the body. While the condition is a rare one, it is sufficient to have seen it once to always recognize it. In some fundi the tortuosity is so great as to give one the picture of the head of Medusa. There is never any sign of varicosity, no adjacent edema of the retina, nor

change in the appearance of the blood. No observer has ever seen this condition develop in a fundus which formerly presented a normal appearance. In arteriovenous aneurism, corkscrewing has been seen, but this was limited to a branch of the central vein. In three cases of Wagner's disease (polycythemia megalosplenica) there was pronounced tortuosity of the veins, and a lesser one of the arteries. In leucocythemia a similar tortuosity has been observed. These observations would lead one to suspect an alteration of the blood in all cases of corkscrewing, but the findings are not such. Levin has found the composition of the blood normal in a case of exaggerated tortuosity, and the only explanation to offer is that a blood anomaly had existed and subsided, leaving the consequent tortuosity of the vessels as a permanent change.

Levin thinks there may be some connection between tortuosity and hypermetropia, but this is disproved by Gloorn observing a typical case of tortuosity in a myope, and Dor in an astigmatic subject. The subjective symptoms are very slight: the subjects complain of temporary obscurations, they cannot stand prolonged use of the eyes, sometimes there seems to be a pressure in the eyes, but, all in all, there is little discomfort, and the visual acuity is generally good. This would seem to prove that there cannot be any serious concomitant nervous trouble. In one case Wilbrand observed facial tic, insomnia, and cardiac palpitation.

M. W. F.

A New Method of Treating Acute Gonorrheal Conjunctivitis.

GOLDZIEHER, W., Budapest (Une nouvelle méthode de traitement de la conjonctivite aigüe à gonocoques, *Arch. d'Ophthalmologie*, Vol. 32, No. 3, p. 129, March, 1912), suggests a novel method of treating this much dreaded condition, which is well worth considering, in view of the success he has obtained with it. He starts with the two facts that the gonococcus lives on the surface and between the epithelial cells, rarely penetrating to the subepithelial cells: and that a temperature of 44° kills the gonococcus in ten minutes, a temperature of 45° instantly. Accordingly he has had an electric water boiler constructed, from which steam can be projected on the eye. Experiments showed that at a distance of four centimeters from the discharge tube the steam had a temperature of 45°, but, in order to be safe, he uses a distance of two to three centimeters. This

apparatus cannot be used until the lids have lost their board hardness and can be turned, which is about the second day. This is no objection to the method, as the infiltration and destruction of the cornea do not begin until after this time. Cocain is of no value for deadening the pain. The conjunctival sac is first washed with a solution of potassium permanganate or a weak solution of oxycyanid of mercury. The cornea is protected by the upper lid; if the latter cannot be well everted the temperature of the steam should be a little higher, so as to penetrate through the lid to the conjunctiva of the fornix. The neighboring parts are protected with moist gauze. No mention is made of the length of time the eyes are exposed to the steam. Only the first application is painful.

Fifteen eyes were treated; in ten of these the cornea was intact at the time of admission, and all were quickly and permanently cured. The rapid regression of the acute symptoms, such as the swelling of the lids, the chemosis, and the purulent secretion was really remarkable, attaining its maximum often on the fourth day. The conjunctiva was again smooth, and the cornea intact in all cases where it was intact at the beginning of the treatment.

In the five cases where the cornea was already attacked it was not possible to save the cornea as a transparent tissue, but still a great deal was accomplished by this mode of treatment, as case 4 illustrates: A man had been under routine treatment (silver nitrate, blenolenicet) for eighteen days. When first seen the cornea was entirely destroyed, the iris protruding through the corneal rim. Suppuration was profuse, the conjunctiva highly swollen, and the pain intense. The patient begged to be put in condition to resume his work. Under chloroform the eye was enucleated, and on the third day the vaporizations were begun. Three days later the suppuration had ceased entirely, and the patient soon returned to his work.

Although the conjunctiva is made aseptic, as far as the gonococcus is concerned, it would be unreasonable to expect an entirely normal conjunctiva after five or six vaporizations. As a matter of fact, there still remains a marked hyperemia and some swelling of the conjunctiva, but these subside under irrigations with potassium permanganate, or, better yet, one-half per cent sulphate of zinc. In the majority of the cases nitrate of silver was not used at any stage.

Goldzieher thinks the superiority of this new procedure over the silver nitrate treatment due to the fact that the heat penetrates into the epithelial layers into which the silver nitrate blocks its own way by forming a precipitate. M. W. F.

Two Cases of Intraocular Cysticercus.

GALLEMAERTS (Sur deux cas de cysticerque intraoculaire, *Archives d'Ophthalmologie*, Vol. XXXII, p. 137, March, 1912). A butcher with visual trouble had gotten rid of a tapeworm, but his visual troubles kept on increasing. Fingers could with difficulty be counted at fifty centimeters. Through a scleral incision a cysticercus was voided without loss of vitreous. Although the vision improved somewhat, the papillitis and retinal hemorrhages persisted, and Gallemaerts recognized the presence of a second cysticercus. Another incision was made in the sclera, but this time there was severe hemorrhage and loss of vitreous, and the cysticercus did not present. Forceps were introduced several times without results. Gallemaerts then proceeded to use electrolysis; a platinum needle on the positive pole was introduced into the region where the ophthalmoscopic examination showed the vesicle to be, and a current of five milliamperes was turned on for five minutes. A scleral suture that had been previously placed was then drawn tight, and a suture placed in the conjunctiva. The ultimate outcome was vision equal to perception of light; eye somewhat sensitive; no return of the cysticercus.

In the second case a salesman was suddenly attacked by loss of vision in the left eye, reducing his vision to counting fingers at fifty centimeters. The presence of a tapeworm could not be determined by the examination of the stools, but was suspected on account of the marked eosinophilia. At last the movements of the cysticercus could be plainly seen. As in the first case, extraction of the cysticercus was first attempted through a scleral incision. Electrolysis was then resorted to. Three weeks later the injection and ciliary pains were so severe that the eye was enucleated.

In regard to the differential diagnosis between subretinal cysticercus and detachment of the retina, Gallemaerts lays stress on the eosinophilia present in the former. This eosinophilia disappears after the extraction of the cysticercus or the enucleation of the eye. Gallemaerts also mentions a novel way of

exploring the interior of the globe; the pupil having been well dilated, a glass slide with a round cavity in the center is pressed on the cornea and a little sterile serum floated between the two surfaces, the interior of the globe can then be readily seen. The article is accompanied by some excellent plates, and a detailed account of the method of operating is given.

M. W. F.

Some Reflections on the Treatment of Strabismus.

BETTREMIEUX (Considerations sur le traitement du strabisme, *Arch. d'Ophthalmologie*, Vol. XXXII, March, 1912, p. 149) takes up the cudgels for tenotomy against the proponents of advancement. He admits that adding an advancement to a tenotomy of the opponent increases the effect of the tenotomy, but denies that secondary strabismus is rarer after this combined operation than after simple tenotomy. Many of Landolt's converts have renounced the advancement in the capsule and returned to tenotomy. One should bear in mind in the consideration of strabismic deviation the part played by faulty innervation of convergence and the results of secondary modifications of the musculoaponeurotic apparatus. For five years Bettremieux has maintained that strabismic deviation resulting from faulty innervation of convergence calls for surgical interference on the nonsquinting eye. Laqueur held that operation of the nonsquinting eye was a step in advance suggested by a better knowledge of the exact nature of strabismus. If, having found that a tenotomy on the squinting eye is insufficient, one proceeds to do a tenotomy on the nonsquinting eye, no fault will be found. Why then should one not proceed at once to do this second tenotomy in the first place, and leave intact the musculotendinous apparatus of the deviated eye? In this way one will avoid inverted strabismus, which is so often the result of the classical tenotomy. Insufficiency of convergence can also be avoided. Bettremieux is surprised that this *modus operandi* did not occur to others before he thought of using it, as Javal says, in regard to a case of strabismus in which the tenotomy was done on the nonsquinting eye: "The result was none the worse, as our object is to correct the relative position of the eyes, not the absolute position of either."

As strabismus operations are generally performed on very young subjects, in whom a definite history is not obtainable,

Bettremieux considers it an error to deduce from the amount of deviation whether or not a bilateral operation should be necessary. Should the tenotomy of the nondeviating eye prove insufficient, it will be found that the deviation is maintained by a retraction of the musculoaponeurosis, in which case an operation on the deviating eye will be called for. In young children a tenotomy of the nondeviating eye will generally be found to be sufficient; in adults the operation on the second eye may sometimes become necessary. If the first operation only is used the formerly deviating eye will have a mobility which will leave nothing to be desired, and the dynamic convergence of the nonsquinting eye will be fully equal to its task.

In a short article following Bettremieux's, E. Landolt gives short excerpts from a number of oculists who have practiced his method of advancement and found it far superior to the method of tenotomy. M. W. F.

Vernal Conjunctivitis.

GABRIÉLIDÈS, A. (*La conjonctivite printanière, Arch. d'Ophthalmologie*, Vol. XXXII, No. 3, March, 1912, p. 156), relates the case of a man twenty years old, with tuberculosis, who developed an attack of keratitis punctata as part of a manifestation of an attack of vernal catarrh in the middle of winter, in consequence of exposure to cold and bright light. In 1908 he had already described two other cases of vernal catarrh coming on in winter, thus giving support to the theory which makes the chemical rays of the sunlight responsible for this condition. He also cites the history of a family in which several members were affected with vernal catarrh. This gives rise to the suspicion that there must be a microbic base to the catarrh. In a man aged twenty-seven, with a vernal catarrh of one month's standing, he found in the scrapings of the palpebral thickening long bacilli, with rounded ends, taking the Borel stain strongly in the ends, and showing a vacuole in the middle. This was the only case in which he found this microbe, although many examinations were made in similar cases.

M. W. F.

Bilateral Paralysis of the Accommodation.

BEAUVIEUX AND DELORME, Bordeaux (*Paralysie bilaterale de l'accommodation, Arch. d'Ophthalmologie*, Vol. XXXII, No. 3, March, 1912, p. 163), observed a case of paralysis of the

accommodation, which was of interest on account of the unusual etiology and the persistence of the paralysis. A laborer, 36 years old, of absolutely negative antecedents, was working over a vat containing alcoholic vapor, when another workman applied a match to the vapor. In the resulting explosion the subject was badly burned about the head and arms, and all the teeth except one in his upper jaw were broken, although the lips showed no bruises whatsoever. In a fortnight everything was in order again except the accommodation. With the proper correction the patient saw 6/6 with either eye, but it required the addition of four diopters to enable him to read. This condition persisted during the four months the patient spent in the hospital, and was still present when the patient was seen later. The authors think the picric acid used on the burns may have been the cause of the paralysis, and do not think the colon bacillus, which was found for a short time in the patient's urine, can be blamed.

M. W. F.

ABSTRACTS FROM SPANISH OPHTHALMIC LITERATURE.

BY

WILLIAM H. CRISP, M. D.,

DENVER.

Tuberculoma of the Pons.

NOCETI, A., Buenos Ayres (*Archivos de Oftalmologia*, January, 1912). The patient, a woman of twenty-three years, came on account of paralysis of the left facial and left abducens, with conjugate deviation of the eyes toward the right. With the left eye covered, the right eye retained all normal movements, but with the left eye uncovered the right internal rectus failed to act. There was at this time no involvement of the optic nerve. Nystagmus was present. The patient returned and died of pneumonia two months later. At autopsy a small tumor was seen at the eminentia teres of the left side. On microscopic study the following regions were found to be destroyed: The upper half of the median and lateral reticular formations, the central gray substance of the fourth ventricle being entirely lacking; the dorsal longitudinal bundle; the crossed root of the trigeminus; the lateral portion of the posterior longitudinal bundle; and the dorsal portion of the central bundle. Among the structures pressed upon or displaced were the motor and sensory nuclei of the trigeminus, and its crossed and mesencephalic roots. Numerous tubercle bacilli were demonstrated in the tissues by a special staining method.

W. H. C.

Failure of Salvarsan in a Case of Iritis.

SANZ, BLANCO, Madrid (*Archivos de Oftalmologia*, January, 1912). Seven weeks after an intravenous dose of 0.5 cgm. of salvarsan, which had caused prompt disappearance of primary and early secondary symptoms, the patient developed an acute iritis with abundant exudate and multiple posterior synechias. The Wassermann reaction, which had been returned as negative a week earlier, was now found to be positive, and a fur-

ther intravenous dose of 0.5 cgm. of salvarsan was given. From this time the eye became very much worse. The iris took on a red color, as though there had been an interstitial hemorrhage, and vision was reduced to quantitative light perception. Vigorous use of mixed mercurial and iodid treatment, begun two weeks later and maintained for four months, caused no improvement.

W. H. C.

Boy Who Could Turn the Upper Lid Without Touching It.

SANTOS, FERNANDEZ J., Havana (*Anales de Oftalmologia*, February, 1912), reports a boy of eight years who was able to turn the upper lid of the right eye with the help of one finger, but could turn the left upper lid without touching it. The edge of the upper lid was apparently pushed up by the edge of the lower lid during vigorous contraction of the orbicularis.

W. H. C.

New Operative Procedure for Entropion of the Lower Lid.

MARIN, AMAT M., Almeria (*Archivos de Oftalmologia*, February, 1912). Districts much affected by trachoma present cases of entropion of the lower lid in which the usual simple procedures entirely fail. Since the entropion in these cases is due to the curling up of all the tissues of the lid, from cicatricial retraction of the conjunctiva and tarsal cartilage, it is clear that any treatment which does not directly attack the causal element must be illogical and inefficacious. The essentials of the operative procedure proposed by the author are section of the conjunctiva and tarsal cartilage, excision of a cutaneomuscular flap, and displacement of the ciliary border. The first incision is made through the skin and orbicularis muscle from the punctum to the external commissure, at three millimeters from the ciliary border. The second incision is semilunar in shape, with its concavity upwards, and its ends joining those of the first incision. A flap is thus formed varying from four to six millimeters in width at the center, according to the effect which is desired. The skin and muscle included between these two incisions are completely removed. Next an incision is made on the inner aspect of the lid, passing through the entire length and thickness of the conjunctiva and tarsal cartilage at a distance of two millimeters from the posterior lip of the ciliary border. The final step is the passing

of three or four sutures from the ciliary border behind the implantation of the lashes, to the inferior lip of the cutaneous wound; and the sutures are so tied as to displace the upper portion of the lid in greater or less degree, according to the correction which is desired. The whole procedure resembles the author's proposed modification of Panas' operation for entropion of the upper lid. The author has used the method successfully in thirty-five cases.

W. H. C.

Diffuse Rheumatic Scleritis.

SCHLEISINGER, FERNANDO S., Rosario de Santa Fe, Argentina (*Archivos de Oftalmologia*, February, 1912). The patient, a physician thirty-five years old, had received in the affected eye saliva coughed from the mouth of a diphtheritic patient. Some days later, after preliminary conjunctival congestion, the whole episclera became diffusely congested. There were marked photophobia and lacrimation, and a sensation of exophthalmos. There was pain in and about the eyeball, which was increased by pressure. To these symptoms were added a catarrhal angina with arthritis of the hand and leg. The patient had been subject to attacks of rheumatism. Local medication only aggravated the eye symptoms. Aspirin was used internally, and after eight days the scleritis began to subside. At the same time a thick mucous secretion began to form, which after three days had the appearance of a typical pseudomembrane covering both tarsal conjunctivas. Bacteriologic cultures were at once made, but proved negative for the Klebs-Loeffler bacillus and also for the Weeks bacillus and the pneumococcus (which are also capable of producing a pseudomembrane).

W. H. C.

Salvarsan in Ophthalmology.

ARGANARAZ, RAUL, Buenos Ayres (*Archivos de Oftalmologia*, March, 1912), describes six cases of optic neuritis and neuroretinitis, all occurring some time after administration of salvarsan for the cure of syphilitic disturbances. He considers that in these cases syphilis played no direct part; emphasizes the close chemical relation between salvarsan and atoxyl; and urges that the former drug should be employed only as a heroic remedy in cases where the mercurial salts have failed.

W. H. C.

Cavernous Angioma of Lid Cured by Bipolar Electrolysis.

MARIN, AMAT M., Almeria (*Archivos de Oftalmologia*, March, 1912). The patient was a female child of five months. The tumor was the size of a pigeon's egg. Its base occupied almost the whole of the lower lid, and the palpebral fissure and much of the upper lid were covered by the growth. Bipolar electrolysis was used five times at intervals of about a week. At each sitting the current was passed in each direction (changing the electrodes but leaving the needles in position) for two minutes, with a strength of twenty amperes. In a month the tumor had completely disappeared, leaving a smooth soft skin, bordered by some large vessels.

W. H. C.

SOCIETY PROCEEDINGS.

BY

T. B. HOLLOWAY, M. D.,

PHILADELPHIA.

SECTION ON OPHTHALMOLOGY.

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

Meeting February 15, 1912. Dr. William M. Sweet, Chairman, presiding.

Cryptophthalmus: Congenital Ankyloblepharon.

Dr. Harold G. Goldberg read a paper on "Cryptophthalmus: Congenital Ankyloblepharon," occurring in five members of one family, and extending through four generations. Although the cases were only partial, it was thought proper to classify them among the ankyloblephara rather than epicanthus, because the partial obliteration of the palpebral space was apparently due to a perfect union between the lid margins instead of an overlapping with the production of a fold; the unusual distance of the puncta from the bifurcation, and because it was possible to restore a considerable portion of the space by elevating the tissue uniting the lid margins. It did not appear that any of the shortening operations suggested for the correction of epicanthus would prove of value in his case, but instead he contemplated the division of the united lid margins after transfixing them upon a lacrimal probe, the resulting surfaces to be joined by fine sutures. Eleven photographs were exhibited illustrating the clinical aspect of the whole series of cases mentioned in his notes.

Hereditary Deficiency of the Light Sense.

Dr. H. M. Langdon referred to a family of five in which the father and one daughter were affected. Each had always been more or less helpless in a dim light, the daughter being especially so. The corrected central vision of the eyes of each was $\frac{6}{5}$ in a good light; the daughter having a moderately high myopic astigmatism and the father a simple hyperopia. The visual fields of each were normal for form and colors in a good light, with concentric contraction in diminished illumination; the fundi were absolutely healthy. The daughter's light sense, tested on Henry's photometer was: O. D., $\frac{3}{5}$; O. S., $\frac{2}{5}$; the father's was $\frac{3}{5}$ in each eye.

Cases of deficient light sense were recognized before the invention of the ophthalmoscope, being known to be transient or persistent, and the latter were either stationary or progressive; with the use of the ophthalmoscope most of them were found to be cases of pigmented retinal degeneration, but certain cases were seen with no fundus changes, and usually hereditary. Many genealogies of such cases have been reported. The most interesting one was studied by Cunier and continued and completed by Nettleship. This included 2,116 individuals, 135 of whom were affected.

These cases are normal in good illumination, but in a dull light are more or less helpless, and often have to be led at night. It is present at the earliest possible tests and remains unaltered through life.

Dr. Zentmayer asked Dr. Langdon whether a comparison could be drawn between the results found with the Forster apparatus and that of Henry's. He thought that the power of the illumination must be an important one as it was necessary that there should be no variation in this at different times, which might be possible even when a standard candle was being used.

Dr. Sweet thought the illumination from a candle would vary in intensity and believed that a gas flame candle power would be more satisfactory.

Dr. Langdon, in reply to Dr. Zentmayer, said that while he was making some comparative studies that would bear on this point, the number of cases so far studied was not sufficient to warrant any definite statement at this time.

Corneal Ulcer—*Aspergillus Flavescens*.

Dr. Zentmayer exhibited the culture and microscopic specimen from a case of *aspergillus flavescens* infection of the cornea. He said that of the many varieties of the *aspergillus* the *fumigatus* was the variety usually found in corneal lesions due to the mold fungi. Other forms are the *flavus*, *glaucus*, and *niger*. The *fumigatus* is the most virulent. The following case is, therefore, of particular interest because the ulcer was due to infection by one of the rarer forms. The patient was a man, aged twenty years, who came to Wills Hospital January 31st, stating that two days before he had gotten a foreign body in the right eye.

There was a superficial ulcer of the cornea not more than 1.5 mm. in diameter, yellowish in color, with a small black central dot. Connected with this, but at a much deeper level, there was a small irregular area of denser infiltration. The edges were well defined, but with the loup the surrounding corneal tissue was quite hazy. There was neither hypopyon nor vascularity, but a good deal of irritation and lacrimation and moderate pericorneal injection. The culture showed a soft furry white coating on the media, which microscopically was found to be due to the *aspergillus flavescens*. The ulcer was curetted, and Ewing's solution and also iodine applied.

According to Fuchs the clinical picture of mold ulcers differs from ordinary *ulcus serpens*. There is first a central corneal infiltrate which later undergoes superficial disintegration, distinguished by its dull, crumbly surface. About this area a gray or yellowish annular line of demarcation forms which gradually deepens into a gutter and leads to an exfoliation of the inclosed portion of the cornea, which in the meantime has become necrotic. Hypopyon is usually present. According to Leber, there is besides this severe type a second milder form characterized by a circular grayish yellow dull patch separated from the uninvaded cornea by a shallow groove, the surrounding cornea being slightly infiltrated. A leash of vessels may lead up to the ulcer from the limbus nearest to it.

Ball states that probably locality has nothing to do with its frequency, as one country physician near St. Louis met with seven cases in two years.

Contusion of the Globe, Vossius Ring-Shaped Opacity of the Lens.

Dr. T. B. Holloway cited the case history of a boy who had been struck on the left eye by a baseball. He was first seen at the University Eye Dispensary in June, 1911, three days after the accident, and twenty-four hours after a lacerated wound through the eyebrow had been sutured at the Surgical Dispensary. At the time of examination the lids of the left eye were moderately swollen and discolored, and the eye somewhat proptosed. There was a moderate ptosis of the left upper lid and an extensive subconjunctival hemorrhage over the external rectus. The left pupil was fixed, horizontally oval, measured 6×5 mm.; no notching of the pupillary margin could be noted. Down and out on the iris there was a small hemorrhage. Scattered through the anterior layers of the lens there were numerous punctate opacities, and centrally there could be noted a ring shaped opacity 3 mm. in diameter, which was made up of numerous fine dots. A number of these punctate opacities could also be noted within the annular opacity. The vitreous was slightly cloudy, and at the temporal margin of the disc there was a small hemorrhage. About the macular region there was a distinct edema. There was a notable impairment in upward rotation and slight in outward rotation. Inward rotation was questionably impaired, and attempts at convergence were painful. The right eye was normal, the vision being $6/5$. The vision of the left eye was $1/22$. When seen eleven days after the accident the ring shaped opacity had disappeared, but a few fine opacities could still be noted in the lens.

Early in February the vision of the left eye was $5/20$. The internal ophthalmoplegia had improved, but had not entirely disappeared. The extraocular muscles had fully recovered. There were extensive retinochoroiditic changes throughout the posterior pole. The literature bearing on the subject and the theories of Vossius and Hoeg were referred to.

Dr. Zentmayer said that he felt certain that this was one of the conditions in which no estimate of its frequency could be drawn from the number of reported cases. He himself had seen three or four cases.

He believed that the opacity was not always transient. He recalled having seen it in the eye in which it had been noted at the time of the traumatism several years before. Its significance, however, had not been recognized when first seen, as it was before the publication of Vossius' paper. He thought that

probably some alteration took place in the anterior subcapsular cells as the result of the impact of the pupillary margin upon the capsule.

Dr. Sweet recalled a case of ring opacity that he had seen at the Jefferson Hospital clinic a number of years ago. There was a history of a blow on the eye by a blunt object. The opacity disappeared in a few weeks.

Dr. Frederick Krauss agreed with Dr. Zentmayer in believing that these cases were more common than the literature of the subject would suggest. He had seen at least three cases, the patients remaining under observation for about six weeks, and then disappearing owing to lack of subjective discomfort.

Dr. Crampton mentioned the case of a young man who came under his observation, having been struck on the eye by a piece of clay, with resultant hyphema and an annular opacity in the anterior portion of the lens. Through the center of the opacity a normal fundus could be fairly well seen. The ring like opacity cleared up almost entirely in from three to four weeks.

In concluding, Dr. Holloway stated that he quite agreed with the opinion expressed by Dr. Zentmayer, that this condition was much more frequent than the number of cases so far on record would lead us to believe. He thought this was emphasized by the fact that of the few cases on record, nine had been reported from the Giessen Clinic during a period of six years.

Some two years ago another case had been observed at the University Eye Dispensary, but unfortunately the man's notes could not be found after a hurried search of the records. In this patient, as far as could be remembered, the opacity was incomplete, and was seen during the subsiding stage, and the lesion ultimately disappeared between the second and third week.

Meeting of March 21, 1912. Dr. William M. Sweet, Chairman, presiding.

Interstitial Keratitis Following Traumatism.

Dr. William M. Sweet reported a typical case of bilateral interstitial keratitis in a girl, aged seven years, who was struck on the right eye by a snowball. The immediate result of the traumatism was a slight edema of the eyelids, moderate conjunctival congestion, but no apparent corneal injury. At the

end of five days the inflammation had nearly disappeared under local applications, but the following day there was an increase in the conjunctival congestion, some photophobia, beginning pericorneal injection, and spots of infiltration in the deeper layer of the cornea. Two weeks later the left eye became inflamed, and the attending physician sent the case to the Jefferson Hospital. The child was undeveloped, poorly nourished, with notched and illformed teeth, and had suffered from infantile convulsions. Both eyes showed typical interstitial keratitis. The mother was healthy, but there was a history of specific infection in the father. A Wassermann test was decidedly positive, and an intravenous injection of salvarsan was given.

Dr. Sweet believed that, while the occurrence of interstitial keratitis after slight traumatism in individuals with hereditary tuberculosis or syphilis could not be doubted, he agreed with Terrien, who recently made a study of the 93 reported cases of traumatic origin, that in only a few of these cases could the traumatism be regarded as a possible causative factor in the production of the corneal disease. Of 670 cases of interstitial keratitis in Uhthoff's clinic, Mohr found only two in which a traumatic etiology was most probable, and in both of these a Wassermann reaction was positive. The subject has recently been fully discussed abroad in connection with the Employer's Liability Acts, and, while many do not deny the possibility of traumatism causing interstitial inflammation of the cornea, they believe that, before arriving at a decision ascribing the disease to the traumatism, there should be absolute soundness of the affected eye previous to the injury, the evidence of actual injury to the cornea should be unmistakable, and the development of the interstitial inflammation should be observed by the surgeon.

Dr. Zentmayer said that he had seen one instance where, following an injury to the eye, interstitial keratitis developed. A boy, aged about eight years, had received a contused wound of the ball, and during the course of the treatment a typical interstitial keratitis with salmon patch developed. He further said that the discovery of trauma as an exciting cause of interstitial keratitis had impressed him with the importance of according more weight to the statements of patients. In conditions long familiar to us and whose etiology has seemingly been firmly established, we are very apt to slight any statement that does not fit in with our views.

Dr. Hansell thought the evidence that traumatism may be

the existing cause of interstitial keratitis, the basis of which is syphilis or tuberculosis, was sufficiently strong to convince the most skeptical. The process is analogous to the history one often hears as to the cause of internal squint—the falling into a tub of water, looking at an object over the back of a crib, or imitation. But such accidents cannot be held responsible for the disease. The diathesis preexisted and the inflammation could as readily be called into existence by any unusual circumstances such as exposure, influenza, or disturbance of the alimentary canal. Therefore, in his opinion, excessive damages or, indeed, any damages at all would not be justifiable.

Dr. Sweet's patient is the second that has appeared at the Jefferson Hospital during the last few months. The other case was that of a boy who stated that he had been struck with a snowball. A typical case of interstitial keratitis developed in the course of ten days.

Dr. S. D. Risley suggested that there were certain analogies in surgery which suggested a possible explanation for the occurrence of interstitial keratitis following an injury, in an individual subject to hereditary syphilis. For example, he had on a number of occasions seen blind eyes, lost as a result of infectious inflammations, but quiescent for many years, have a recurrence of former conditions following a slight injury, as though imprisoned microorganisms had been released by the injury. He called attention also to the fact that in rheumatic people a slight injury to a joint was prone to set up acute and quite characteristic inflammatory reaction of a rheumatic type. Many children, the subject of hereditary syphilis, had specific retinal endarteritis and quiescent choroidal patches; he had seen many illustrations of this in children with impaired visual acuity but quiet eyes. He thought it was probable that in such cases an injury might be sufficient to light up a general uveitis, of which the interstitial or parenchymatous keratitis were only phases.

Dr. Sweet, in closing, stated that the subject was important from the possible claims for damages that may be made for slight injuries which, in a healthy individual with no antecedent morbid condition would be unimportant, but in those with inherited tuberculosis or syphilis may be followed by a long-standing corneal disease. Unless the infiltration occurs at the point of injury and spreads under the observation of the sur-

geon, and implicates the deeper corneal layers, and the affection remains unilateral, it is questionable whether the keratitis can be regarded as the result of the traumatism.

Secondary Glaucoma in Interstitial Keratitis.

Dr. Edward A. Shumway read a paper on "Secondary Glaucoma in Interstitial Keratitis," and reported the history of a case. He said that von Graefe had called attention to the fact that changes in intraocular tension appeared in interstitial keratitis in 1869; that the usual change was a lowering of tension, which was not serious unless it occurred as the result of shrinking of an exudate; and that occasionally though rarely the tension was increased. Similar statements have been made by Greeff and Hoor in their monographs on the subject, and are to be found in the best text-books on ophthalmology. His experience had been limited to the present case, a young man, aged twenty years, who had been treated through three attacks of interstitial keratitis, due to hereditary syphilis. Recent examination had shown decided rise of tension (to 45 mm. of mercury, tested by the Schiötz tonometer), complete cupping of the optic nerves, atrophy of the nerves, contraction of the visual fields, and reduction of vision to $6/60$ in one eye and $1/60$ in the other. Eserin contracted the pupils and controlled the pain but did not reduce the tension. A Lagrange operation had been done on each eye, and the tension had returned to normal. Dr. Shumway said that in some cases the rise in tension was to be explained by seclusion of the pupil resulting from the accompanying plastic iritis. When this was not present it was probably due to coexisting involvement of the ciliary body and anterior part of the choroid, and the usually accepted theory was the increased difficulty in filtration, due to the blocking of the channels in the filtering angle by excessive amount of albumin in the aqueous. In the treatment, eserine or pilocarpin and dionin were advised, unless they increased the irritation. Paracentesis of the anterior chamber was usually effectual by removing the abnormal contents of the anterior chamber, and could be repeated. Iridectomy was necessary, especially in the presence of pupillary seclusion, or if tension was persistently elevated, but should be postponed, if possible, until inflammatory symptoms had entirely disappeared. Dr. Shumway read also brief notes of three cases which Dr. de Schweinitz

had seen, in all of which there was cupping of the optic nerves, atrophy, and contracted visual fields. In conclusion, the speaker said that a rise of tension was very commonly seen in herpetic keratitis and allied forms, particularly in elderly patients, but was equally uncommon in parenchymatous keratitis, which usually affected a younger class. Fortunately the attacks were generally of short duration, but if they came late in the course of the disease might be permanent, and require operative intervention.

Blepharoplasty for the Relief of Anchyloblepharon and Symblepharon.

Dr. Zentmayer exhibited a case for Dr. Posey of extensive blepharoplasty which had been performed for the relief of anchyloblepharon and complete symblepharon of the inner third of the lids following a burn. The operation had been performed in three stages: (1) The division of the anchyloblepharon, the dissection of the lids from the globe, and the superposition of a skin flap taken from the adjoining skin at the side of the nose upon the raw surface of the globe; (2) after some months, the division of the skin flap from its pedicular attachment, thus allowing the globe to rotate freely in all directions; (3) the restoration of the inner canthus, by excision of the redundant portions of the skin flap, and by the union of the edges of the lids at the canthus. Cosmetic result excellent save for some downward traction upon the inner portion of the lower lid, occasioned by cicatricial bands. An attempt will be made to overcome this later by division of the bands and by the insertion of a graft or flap into the ensuing gap.

Case of Unsuspected Small Spindlecell Melanosarcoma of the Choroid.

Dr. Chas. R. Heed reported the clinical history of a male, aged thirty-one years, whose family history was negative. His personal history, aside from pneumonic typhoid at the age of fifteen, was also negative. There had been no ocular disease previous to July 28, 1910, when the patient's right eye was struck by a fist. The patient had a "black eye," but no pain twenty-four hours afterward. Failing vision was first discovered seven months later. August 1, 1911, the right eye suddenly became painful and symptoms of iritis developed. The

pain did not yield to treatment, and after dilatation of the pupil a further diagnosis of iridocyclitis with old retinal detachment was made. The eyeball was enucleated August 28, 1911. A gold ball was implanted and an excellent socket obtained. Up to date the patient has been absolutely comfortable.

Dr. Sidney L. Olsho (by invitation) reported the pathologic findings.

Macroscopic: The eyeball measures 25 mm. in diameter. The uncut ball presents nothing unusual. Internally, the posterior third is occupied by a dark and irregular solid mass. The posterior surface of the mass is smooth and in approximation with the sclera over an area 20 mm. in diameter directly over the posterior pole of the eye. The anterior surface of the growth is irregularly tuberos, extends at its apex 14 mm. forward from the nerve head to within 3 mm. of the lens. The retina is pushed forward. The vitreous chamber is filled with exudate. The lens is displaced and the anterior chamber contains considerable exudate. The cut surface of the growth is of a mottled gray color.

Microscopic: An extremely cellular mass infiltrates the choriocapillaris. The mass lies directly over the nerve head. The lamina suprachoroidea separates it from the sclera. The vitreous lamina of the choroid, together with the retina, are pushed forward by it. Within its confines the choroidal structure is entirely replaced by a more or less dense aggregation of small, spindle shaped pigmentiferous cells, which have no orderly arrangement. Collections of extracellular pigment are also present. The mass contains a scanty amount of fibrous connective tissue in scattered strands, a few thin walled blood vessels and a number of blood spaces. At the tumor margins normal choroid can be identified, and anteriorly a portion of the retina. The optic nerve is infiltrated with scattered spindle shaped cells, similar to those making up the tumor mass.

Diagnosis: Small spindle-cell melanosarcoma of the choroid.

Dr. H. Maxwell Langdon showed the pathologic specimens of an eye which had been the site of a sarcoma of the choroid. The patient was first seen in 1906 for refraction. In 1908 she returned complaining of blurred vision of the left eye. There was a small sharply circumscribed detachment of the retina in the lower part, causing a small relative scotoma in the upper field: transillumination showed a dimming of the shadow over

the affected area. A diagnosis of growth, probably sarcoma, was made, and enucleation advised. The detachment was about 3.5 D above the fundus level.

The patient sought other advice and was told by two oculists it was a simple detachment, and one wanted to do a sclerotomy. Later she returned, and by June the elevation of the retina was 12 D above the fundus. The eye was enucleated and a small sarcoma of the choroid was found, surrounded by considerable hemorrhage.

Dr. William M. Sweet commented upon some interesting features in connection with the case.

Dr. William Zentmayer asked Dr. Sweet whether with the knowledge that an intraocular growth was being dealt with, it would be considered a perfectly safe procedure to insert a globe into the capsule of Tenon.

In reply to Dr. Zentmayer, Dr. Sweet stated that he regarded a malignant intraocular growth as a contraindication to the implantation of a ball in Tenon's capsule. In the series of cases of implantation which he reported some years ago, a small sarcoma of the choroid was found in one of the eyes after enucleation, but at the present time the gold ball was in position and the orbit hearty.

Dr. J. B. Turner referred to a somewhat similar case that had come under his observation. A woman, aged fifty-six years, had a fall in March, 1909, and injured the left eye. No treatment was administered until she was seen in June, 1909, by Dr. Thomas S. Tait, for an attack of acute glaucoma. No view of the fundus could be obtained, and an iridectomy was done for relief of pain. During Dr. Tait's absence from the city the patient was seen, on August 25, by Dr. Turner when sympathetic inflammation had developed in the other eye. At this time the vision of the good eye fluctuated from 6/9 to 22/100. After consultation with Dr. de Schweinitz, operation was advised and the eye was enucleated October 12th. On sectioning a sarcoma of the choroid was found. The patient did well and there has been no metastasis up to the present time. Dr. Tait will report the case in detail at some future time.

Exhibition of a Transilluminator.

Dr. Charles R. Heed exhibited a simple and practical transilluminator that he had been using with satisfaction for the last five months.

Meeting April 18, 1912. Dr. William M. Sweet, Chairman, presiding.

Keloid Epithelioma of Lid—Fricke Flap.

Dr. S. Lewis Ziegler exhibited a patient showing an excellent result that had been obtained by the use of a Fricke flap after excision of a keloid epithelioma of the upper lid. A large flap, three-fourths of an inch wide and one-third larger than the wound, was outlined on the forehead and turned down to cover the denuded area. All adhesions were severed and the eyeball made mobile. The flap was loosely stitched into place, while the edges of the supraorbital wound were undermined and joined by sutures. A dressing of perforated protective was laid over the wound and a hot water bag applied for two days. A leaky discharge of serous exudate appeared and necessitated the removal of the rubber protective and the application of a wet dressing of gauze pads wrung out in weak creolin, 1 to 500. The sutures were removed on the tenth day, and no suppuration or discharge could be seen. Six weeks have elapsed since the time of operation. There is but little redness or marks of stitch holes remaining and the flap has healed down perfectly soft and smooth.

Dr. Zentmayer said that he had never seen less scarring after a plastic operation. He had been particularly unfortunate in two cases in having keloid scars which in one instance was quite disfiguring. He had always used protective and thought it possible that Dr. Ziegler's beautiful result was in part due to the after dressing.

Zeiss Loupe.

Dr. Ziegler also exhibited and demonstrated the Zeiss teleater prism glass with loupe attachment, which he regarded as having a distinct advantage over the ordinary loupe commonly used.

Secondary Glaucoma in Interstitial Keratitis.

Dr. Edward A. Shumway demonstrated the case of secondary glaucoma in interstitial keratitis, which he had reported at the previous meeting. He said the intraocular tension had remained at a satisfactory level, since the operations; vision in the right eye was 6/60, and in the left eye about 3/60.

Scotometer.

Dr. H. Maxwell Langdon exhibited an instrument which was a small edition of the carrier of a perimeter with two revolving discs, one for the colors and the other with apertures varying from 1 to 10 mm.; it is on a jointed handle and is intended for use with any nonregistering perimeter, a hand perimeter or on a flat surface as in Bjerrum's method of scotometry. It is made by Wall & Ochs of Philadelphia.

Dr. Holloway stated that he was sure Dr. Langdon's instrument would prove of much service. That he had found in the use of the stick he had shown some time ago that unless a certain amount of care was taken the gummed paper discs would be dislodged from the holder. Dr. Langdon's instrument will prove of service in a hasty determination of the visual fields, but he thought that its efficiency could be improved by having it constructed so that the colors could be seen by the examiner as well as by the patient. In this way one could use his own fields for comparison.

Probable Pseudoglioma.

Dr. Krauss presented a boy, aged eight years, with an exudate or growth in the vitreous chamber. The growth had rather a sudden onset, with very transient inflammatory symptoms. When first seen there was some shallowness of the anterior chamber and posterior synechia on the temporal side. The temporal half of the eyeball was occupied by a mass giving greenish yellow reflex by daylight. The nasal half presented a reddish reflex in the direct examination, but no details of the fundus could be seen, owing to fine vitreous opacities. The tension was normal or slightly increased. One week later the tension quickly dropped to -2 ; the eyeball has continued very soft. The vitreous had gradually cleared, showing numerous bloodvessels running over the growth, in one place having the appearance of the optic disc, best seen with $+12$ D. The fellow eye is normal with a hypermetropia of 2 D. He first made the diagnosis of true glioma, but after the drop in tension, revised it to pseudoglioma of the retina. The parents have refused operation. The family history is negative.

Dr. H. F. Hansell was inclined to the diagnosis of real glioma rather than pseudoglioma because of the rapid advance of the process, the dislocation of the iris and lens, the rounded and

well outlined contour and the absence of any history of a septic condition of the body. The present low tension did not, in his opinion, militate against the diagnosis of tumor, for in his experience intraocular tumors are not always associated with plus tension.

A degeneration and softening of some of the intraocular structures present in advanced stages of the disease will be accompanied by lowered tension. In either case he would recommend enucleation of the ball.

Dr. Ziegler thought that the conditions present did not resemble the cases of glioma he had seen, but was of the opinion that it was probably a pseudoglioma. When the report of the tuberculin test has been received it may be found that it is tuberculous in character. In view of the fact that there was so much disturbance about the ciliary body, he thought it might be wise to enucleate the eye.

Dr. Zentmayer said that he thought the condition to be one of pseudoglioma. The distinctly low tension, and apparently slight shrinking of the globe together with muddy structureless appearance of the mass all suggested a plastic inflammation. While the absence of a distinct increase in tension did not exclude a new growth he thought the presence of a minus tension practically did so. He had never seen a minus tension in intraocular tumor except in the last stage.

Dr. Shumway said he was inclined to consider the condition the result of a plastic iridochoroiditis, and not a glioma of the retina, in the first place because of the signs of iritis as shown by the posterior synechiæ; secondly, because of the gradually clearing opacities of the vitreous in advance of the mass; and finally the lowering of the intraocular tension which he did not believe would exist in the presence of a tumor mass as large as that in Dr. Krauss' case. Whether the eye should be enucleated or not was another question. Frequently the retention of such an eye had a distinctly depressing influence on a child's general health, and under such circumstances enucleation was advisable and very beneficial, even if the diagnosis of tumor could be excluded.

Polycythemia With Choked Disc.

Dr. William T. Shoemaker exhibited a case of polycythemia and stated that the history had been previously reported before the Philadelphia County Medical Society by Dr. Walter S. Lucas in January of this year, but the patient was not shown.

He was brought before the Section tonight for exhibition only, and no attempt would be made to add anything to the excellent description by Dr. Lucas, whose paper will be published shortly, or to the literature of chronic cyanosis and polycythemia so recently reviewed by Dr. Holloway.

The man's hospital career so far includes the Pennsylvania, where he came first under Dr. Shoemaker's observation; the Jefferson, the German, where he had further opportunity of examining him; and back to the Pennsylvania, where for the minute he is again Dr. Shoemaker's patient. Although of course interesting in many ways, special interest from an ophthalmic standpoint lies in the violent changes which are shown in the optic nerve, retina, and bloodvessels. These changes are those of typical inflammatory choked disc, identical, it would seem, with those frequently seen with intracranial disturbance.

Carl Behr, in a most important communication upon this subject last year, including a case with microscopic examination, says that his case of polycythemia was the first reported with typical choked disc, and while referring to a number of cases of cyanosis in which optic neuritis, blurring of the disc margins, etc., were noted (Hirschberg, Posey, Harms), he is inclined to think that the changes in these cases were not inflammatory but were due to edema, and, in the absence of swelling, represented perhaps the beginning stages of the more pronounced condition.

The retinal changes which Behr demonstrated from his case are enlargement of the veins with no other alteration in the vessel walls than loss of elasticity and thinning. The retinal capillaries showed general distention and irregularity with fusiform dilatations. All of the veins were filled with red cells, but Schlemm's canal, on the other hand, showed no enlargement, and contained but a limited number of red cells. There was a general round celled infiltration. The choroidal vessels were greatly distended, and in pronounced cases, he says, the sclera may be of a decided bluish color.

Whether or not the case shows simple edema around the nerve head or pronounced choked disc as in Behr's case or the case which I show, would depend, according to him, entirely upon the equilibrium maintained in the eye between the fluids from the blood thrown into the tissues and that carried off through the ordinary lymph channels. The choked disc in

polycythemia, he concludes, originates solely from local edema of the papilla and the peripheral end of the optic nerve, and, he states, that this choked disc ophthalmoscopically and microscopically, is in no way different from that of intracranial origin.

Dr. Holloway stated that through the courtesy of Dr. Shoemaker he had previously examined this patient, when he was in the German Hospital, and he thought the fundus manifestations were most unusual. While various marked disc changes have been observed in cases of cyanosis retinæ resulting from various causes, Behr states that his case of polycythemia was the first in which a choked disc had been observed. Loring, in his description of a case of cyanosis retinæ, stated that a previous observer had regarded the condition as a choked disc, and while Loring gives a description of the vessels and so on, he fails to mention the changes occurring in the nerve head. He thought Ulthoff had also reported a case associated with a choked disc, but in this case a brain tumor could not be definitely excluded; he regretted that he could not recall the reference pertaining to this case. There can be no doubt that the changes exhibited by Dr. Shoemaker's patient were very remarkable, as there exists all the characteristics of a true choking.

Sarcoma of Choroid.

Dr. J. B. Turner reported the following history of a case of sarcoma of the choroid: Mrs. B., aged forty-five years, complained of failing vision of the left eye for six months prior to the time of examination. The family history was negative. Upon examination a retinal detachment was found down and out from the macula, and the field showed a scotoma extending from the fixation point to 35° externally and 20° above. The eye was apparently quiet and the tension normal. Enucleation was advised and the diagnosis was confirmed by Dr. Howard F. Hansell, who saw the case in consultation with Dr. Turner. The vision was 6/22—; transillumination was positive. Dr. Sidney L. Olsho examined the eye microscopically and reported as follows: A flat mass of abnormal tissue 3 mm. in diameter was found 5 mm. down and out from the nerve head. There was a subretinal exudate and the retina was detached over a large area. The tumor area exhibits an extremely cellular

mass replacing the capillary portion of the choroid. The mass lies between the suprachoroidal layer and the vitreous lamina of the choroid. The cells composing it are small, spindle shaped, and closely packed; they have no definite arrangement. One or two bloodvessels and a few blood spaces are seen. A moderate amount of pigment is present which is both intra- and extracellular. The normal capillaries of the choroid can be recognized at the tumor margin. Diagnosis: Small spindle celled sarcoma of the choroid.

Entropion Relieved by Snellen Sutures.

Dr. William M. Sweet exhibited a man, aged twenty years, who had spastic entropion of both lower lids since he was six years old, the left lid being completely everted while the defect was partial on the right side. Two sutures, according to the method of Snellen, had been inserted three weeks previously on the left lower lid, and allowed to remain for ten days. The result of the operation was to completely correct the deformity, and bring the lid margin in perfect contact with the eyeball. Applications of tannate of glycerin were made daily to the palpebral conjunctiva to reduce the swelling and chronic inflammation.

Optic Neuritis With Temporary Blindness Due to Sinusitis.

Dr. Zentmayer reported the clinical history of a case of optic neuritis with temporary blindness due to sinusitis. A. B., merchant, aged thirty-eight years, widower. A history of recurring attacks of sinusitis for which he had been operated upon in Chicago. Five days ago following a period of nervous tension he felt fulness in the frontal region accompanied by numbness in the arms extending to the fingers and failing vision in the right eye. O. D., hand movements; O. S., 6/6 pt.; O. D., slight prominence of the papilla with enlargement of the veins. O. S., normal, except veins dark. O. D., small superior field; O. S., normal except enlarged blind spot. Nasal examination by Dr. G. M. Marshall showed removal of anterior portion of both turbinates with perforation of the septum and grumous discharge from above the turbinates. Local nasal treatment and antisiphilitic treatment was followed by absolute blindness in O. D. in five days. The ethmoidal cells were then opened, the sphenoid cells perforated and the ethmoidal cells curetted.

Vision returned the next day and gradually improved until at the end of two months it equalled 6/18 pt. The nerve was decidedly atrophic. On two occasions small infected corneal ulcers occurred. One year later with fulness of the frontal region the optic papilla on the left side was found hazy and the blind spot very much enlarged. The mucous membrane of the nose was again found hypertrophied and the anterior ethmoidal cells were closed in with probable bone formation.

Dr. Krauss stated that in his opinion a great advance had been made in ophthalmology when unilateral nerve disease was referred to the nasal sinuses even when the latter do not appear to be greatly diseased as in Dr. Zentmayer's case. Dr. Krauss had referred to him a few weeks ago, a man, aged fifty years, in whom the vision had dropped suddenly to about one-third of normal in the right eye, the patient being conscious of a continued blur. There was nothing to account for this condition, the fields of vision were normal, with no scotomata, but a slightly enlarged blind spot. The right nostril had been operated for polyps by a New York rhinologist some years ago, with good results. There remained a large posterior ethmoidal cell projecting into the outer side of the sphenoid, showing no evidence of disease. He thought it advisable to open the cell and found it filled with small polypi. It was cleaned out and in one week without additional treatment the vision was normal with the disappearance of the blur.

Dr. Zentmayer said there seems still to be skepticism on the part of some rhinologists toward the causative relation between sinus disease and serious ocular disturbance, and the oculist sometimes finds it necessary to assert himself in order to have radical operations performed where the casual examination of the sinuses seems to indicate that they are in a healthy condition.

Edema of the Orbits, Secondary to Facial Dermatitis.

Dr. Howard F. Hansell in describing the symptoms present in his patient said that the left cheek was flushed and swollen, unyielding, and hard to the touch, not sensitive, and distinctly higher in temperature than the forehead. The right cheek was similarly affected but much less in degree. The left conjunctiva was puffed, arranged itself into folds as the eye turned in various directions and was formed into a ridge by the closing of the lids. The edema could be shifted into areas of swelling by

pressure upon and movements of the lower lid by the finger. The eye was unaffected and the vision was good.

The infiltration of the right orbit was more easily studied because the right eye had been enucleated many years ago. The artificial eye which had been worn with comfort was extruded after every attempt to wear it, and finally it was impossible to insert it.

The general symptoms consisted of an elevation of temperature ranging from 99° to 103° , pain, swelling, and stiffness of many of the larger joints and a superficial evanescent and frequently appearing erythematous like rash. The infiltration of the orbit was regarded as an alarming complication, as in the first few days of the illness it appeared as though the structures posterior to the globe in the orbit would become involved, as so frequently happens in erysipelas, and the functions of the eye disabled or lost.

An injection of 20 cc. of streptococcic serum was given the first day; 30 cc. the second and 40 cc. the fourth day after admission to the hospital. The dermatitis in the left side and the orbital edema became promptly better, but the disease itself was not favorably influenced, as was shown by increased swelling and infiltration of the skin and orbit on the right side.

After seven days of the continuance of the orbital complications the local symptoms subsided and the artificial eye has been worn with comfort. At no time was there any disturbance in the interior of the left eye or any abnormal limitations of its movements.

T. B. HOLLOWAY,

Clerk.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

Meeting February 19, 1912. President Dr. Thomas Faith in the chair.

A Case of Orbital Dermoid.

Dr. George F. Suker presented a case of orbital dermoid in a baby of four months, whose mother had noticed a few days after its birth a small pinpoint elevation on the upper right brow at the angle. A physician lanced it; it evacuated itself; filled again, and was again lanced fourteen days afterward. Dr. Suker saw the baby at this time, at the request of Dr. Hultgen. On probing he found a sinus leading downward toward the external orbital angle and then passing along the upper lid toward the internal canthus. He removed several hairs from the depth of the tract. He laid the sinus open, retracted the upper portion of the lid, and worked subcutaneously toward the inner canthus, removing a large, dense, firm, cicatricial, sac-like tumor, filled with caseous material and some hard substance. He then passed the probe backward toward the sphenoidal fissure, outlining some more tumor mass, and cleared out the tract. The tumor had penetrated the levator palpebræ muscle, destroyed the superior and external recti and the oblique muscles. All went well for about three weeks, when a swelling again appeared and a discharge came from a sinus in the upper retrotarsal fold. He made the second incision directly over the eyebrow, extending from angle to angle, retracted the upper lid downward and laid bare the orbital wall above, going back to the sphenoid fissure and taking out everything except the nerve. He found one or two small sacs which contained dermoid material. He excised the retrotarsal sinus, did not irrigate or pack the wound, but closed it. The tumor involved the lacrimal gland, and it also was removed. The globe is fixed downward. The iris reacts to light, and the nerve head is intact. The wound is still discharging and further procedures are under consideration.

Microscopic sections of the mass made by Dr. Hultgen disclose cartilage, sweat and sebaceous glands and hair follicles. The question is, is it a dermoid or a teratoid? If the latter, it is to an extent a fetus in fetu. The tumor had worked itself

through the periosteum and began to erode the orbital wall at several points.

Discussion.—Dr. Thomas Faith suggested that if the discharging sinus did not contain bacteria, it might be well to fill it with bismuth paste, providing its limits are known and that the paste would not press on the optic nerve.

A Case of Rupture of Sclera.

Dr. M. H. Lebensohn presented a man, 58 years old, who slipped while shoveling coal, striking the lower eyelid of the left eye on the edge of the coal car. He became blind at once, and there was much discoloration of the eyelids, but no swelling except a protrusion on the globe at the upper and inner limbus. The protruding mass was clear, but its contents could not be determined. From the shape and firmness it looked like the lens and vitreous. The only treatment instituted was a pressure bandage and strict antiseptic measures. Enucleation is indicated, as vision is absent. The patient does not complain of pain.

Penetrating Wound of Sclera.

Dr. M. H. Lebensohn presented a boy, 8 years old, who was stabbed in the right eye with a knife on January 23d. The knife entered the upper lid and passed downward into the sclera, the vitreous protruding from the wound. Vision was nil. A pressure bandage was applied for three or four days, and when there was no evidence of infection the wound in the sclera was sutured. It healed promptly, and the vision is now fingers at three feet. The fundus shows where the knife passed through. There are opacities in the lens.

A Case of Subhyaloid Hemorrhage.

Dr. H. W. Woodruff reported a case of subhyaloid hemorrhage. The following is the report of a case seen by Dr. H. W. Woodruff in consultation with Dr. A. W. Lloyd of Hammond, Indiana. The history, as taken by Dr. Lloyd, is as follows:

"Patient, Mr. S. T., age 38 years, policeman, was first examined January 15, 1912. Two days before, about 11 a. m., while shaving, he noticed he was blind in the right eye. Subjective symptoms other than the loss of vision were absent. An ophthalmoscopic examination showed a large hemorrhage, cir-

cular in outline, in the macular region, with well defined edges except at the temporal margin, where it gradually faded off into the surrounding fundus. On the opposite side the hemorrhage covered a small portion of the disc, and in this situation the line of demarcation was particularly well marked. He could see a light at 10 inches, the light appearing red. No history of lues or other infectious diseases, or of the cardiovascular system. Urinalysis and tuberculin tests negative. The patient was treated for a time by rest in bed with hot applications, potassium iodid and mag. sulph. A gradual improvement took place until now the patient can count fingers at one foot."

The interest in these peculiar effusions centers around their rarity, the sudden and complete loss of central vision, and the possibility of complete absorption with no damage to the retina or vitreous. Hotz, writing in 1893, reports three cases, that being the number he had seen in twenty years of practice. All of them recovered normal vision. The cause of one was ascribed to menstrual disorder. Another to a cough, and the third could not be explained. One patient died from apoplexy one year later. Dr. Hotz also referred to cases reported by Dr. Haab, in which the hemorrhage was in one case on the nasal side of the disc, in another below the disc. The majority of them, however, were in the macular region.

Discussion.—Dr. Oscar Dodd said he had a similar case occurring in a young lady, about twenty, after the ingestion of *santonin* for vermifuge purposes. Similar cases have been recorded in the literature. In this case there was a large hemorrhage involving the same area as in Dr. Woodruff's case, and vision was restored practically to normal.

Dr. Thomas Faith cited the case history of a man who was injured in one eye a year ago, and had what he at first considered a subhyaloid hemorrhage. The patient had an absolute blind spot, but after several weeks the shape of the hemorrhage did not change by gravity, as is the case with subhyaloid hemorrhage. The eyeball was not ruptured, and from external appearances was not injured. After a month the hemorrhage began to absorb around the margins. Later there appeared a little dark outline in the choroid. After the hemorrhage had been completely absorbed it showed that there had been an injury which ruptured one of the choroidal vessels, and the

hemorrhage ensued, which from its location made it impossible to see whether any retinal vessels had been ruptured. There was a complete coloboma in the choroid, with rupture and a tear across one of the large veins.

Dr. E. J. Gardiner said that Dr. Woodruff need not be discouraged about the "slowness in clearing up," and stated that three or four years ago he had seen a much more extensive subhyaloid hemorrhage, producing nearly complete blindness, clear up after a year and a half. When the patient was last seen, all but the lower portion of the hemorrhage had disappeared. Unfortunately the tissues in the macula region had been so much affected that there was central blindness. The patient was sixty-three years old. He thought that Dr. Woodruff would be justified in giving a relatively favorable prognosis in his case.

Dr. O. Tydings said that several years ago he had a patient, over seventy years old, who had such a hemorrhage. There was little vision in the eye at the time. Subsequently the condition cleared up entirely, but vision was lost.

Dr. David Fiske cited the history of a boy, fourteen years old, who, in September, 1911, suddenly lost sight in his right eye. Vision had previously been normal, except for half a diopter of hypermetropia. There was no history of trauma. The boy was riding on the platform when suddenly vision in his right eye failed. On examination there was found a large hemorrhage in the region of the macula, with no vision, except for light and hand motion. Vision is much better now, and the hemorrhage is pretty well cleared up. The vitreous is somewhat cloudy, with opacities.

Dr. H. W. Woodruff, in closing the discussion, said that cases of this kind were comparatively rare. The prognosis, he said, was generally favorable, although in his case the condition is not clearing up as rapidly as it is usually said to do. The hemorrhage has cleared up somewhat and vision has improved, but even after a month absorption is far from being complete.

A Case of Interstitial Keratitis.

Dr. Mortimer Frank reported the history of a young man whom he first saw in September, because of a typical interstitial keratitis. The patient had syphilis five years before; a Wassermann was positive. He was given mixed treatment, and in six weeks the cornea began to clear up. At present there are only

a few opacities in the center of the cornea. The two central incisors are slightly notched. There is no erosion of the dentine.

Discussion.—Dr. E. V. L. Brown suggested that a Wassermann test be made of the patient's father and mother, because in spite of the history the keratitis might be a congenital condition.

Dr. Thomas Faith thought these cases nearly all congenital. He has never seen but two or three acquired cases of interstitial keratitis.

Dr. H. W. Woodruff also regarded it as a case of congenital interstitial keratitis, and would not consider the Wassermann reaction or the history, because he thought the patient's facies indicated an inherited disease. The teeth and the angles of the mouth, he thought, were characteristic of inherited syphilis.

Dr. Oscar Dodd would not disregard the possibility of acquired syphilitic interstitial keratitis, because he has seen two cases, before the Wassermann test was in use, in which there were absolutely no signs of hereditary syphilis, but the history of acquired syphilis was positive. These cases, he said, are not similar in appearance to the ordinary cases of interstitial keratitis. They are apt not to begin at the periphery, extending inward, but begin in spots. Dr. Loring, he said, presented two patients to the society some years ago who gave the same history. They also were different in appearance and cleared up under treatment.

Dr. George F. Suker looked up the literature of the subject not long ago, and failed to find a single case reported in which there were not some of the characteristic markings in the teeth. If any teeth show these markings, the permanent teeth are the ones. It is not necessary to have the incisors marked: in fact, the molars are more apt to show a characteristic marking. Instead of having the four cusps covered by enamel, the enamel is absent, and the surface of the tooth shows dentine pegs, which in time are ground flat. Where the cusps should be the dentine proliferates. These are the so-called Fournier teeth. It is not necessary to have peg teeth or separated teeth or notched teeth to determine the question of inherited syphilis. The markings of the first permanent molar are always present. In no case of interstitial keratitis which he has seen were they absent.

Dr. H. S. Gradle suggested that the luetin reaction of Noguchi might prove of value in this case. It is negative in the primary and early secondary stages, but is positive in the late secondary and tertiary stage in from seventy-five to eighty per cent of cases.

Dr. Mortimer Frank, in closing the discussion, stated that inasmuch as the young man had had the initial lesion of syphilis and the keratitis followed, he considered it very likely a case of acquired and not congenital syphilis.

A Case of Epithelioma of the Lid.

Dr. Oscar Dodd presented a patient who had epithelioma of the lower lid, which he removed, securing very good results. The tumor involved about one-third of the lid, and was about one centimeter in depth. He removed the lid for about twelve millimeters lengthwise and three or four millimeters sideways; loosened the conjunctiva and removed a "V"-shaped piece of the skin. He then made an incision in the skin from the external canthus of the eye, cut the tendon of the lid, brought the temporal part of the lid over, and sutured it, making a skin flap to cover the defect. The lid at the present time is soft and pliable and acts as well as before.

Discussion.—Dr. George F. Suker referred to a case of melanosaarcoma of the lower lid in a child, eight years of age. He did the same operation, but in order not to have the upper lid drop down over the flap angle, he fixed the edge directly into the external canthal wound. He believes that the sliding operation gives a much better result than any other.

Dr. Oscar Dodd, in closing the discussion, said that he had failed to find any description of the operation he had carried out in any of the text books.

A Case of Tubercle of the Choroid.

Dr. Charles C. Clement (by invitation) presented a patient, a male, age seventeen, Swedish descent, stenographer, who came to the Illinois Charitable Eye and Ear Infirmary about five months ago, complaining of failing vision in the right eye of about three weeks' duration. Family and childhood history negative. No recent temperature, cough or loss of weight. No specific history. The present trouble came on insidiously and without pain, failing vision being the only symptom. At

the time of admission it was 20/70 in the right eye, and 20/20 in the left eye.

In the affected eye there was slight dilatation of the pupil, normal tension, slightly deepened anterior chamber, cloudiness of the aqueous, very slight pericorneal injection, and a precipitate of fine dots on the posterior surface of the cornea. Opacities in the vitreous somewhat obscured the details of the fundus, but a round yellowish white spot somewhat smaller than the disc could be seen situated above the disc and to the temporal side, at about eleven o'clock. It appeared to be slightly elevated and at that time its borders shaded gradually into the surrounding fundus. Since that time degenerative changes have evidently taken place and a rose colored border has appeared around the lesion. Urinalysis was negative. Wassermann test was not made. Von Pirquet cutaneous test was positive. Subcutaneous test with old tuberculin was positive. He has been given gradually increasing doses of tuberculin T. R., under which he has shown slow but constant improvement. The cornea and vitreous have cleared to a considerable extent, his vision now being 20/40 in the affected eye. He was recently examined at the Rush Medical College, and no evidence of tuberculosis, other than that in his eye, was detected.

Discussion.—Dr. Mortimer Frank has seen quite a number of cases of tubercle of the choroid, because of the large number of children with tubercular meningitis who are brought to the Michael Reese Hospital. Unfortunately, these children were not seen by him until shortly before death, because the ophthalmologist is not called in until death is imminent. He has seen one case in a man eighteen years old which terminated fatally. In all the cases the tubercle bacillus is found in the spinal fluid, and he thinks that the bacilli should be looked for in all cases, especially if they are known to be cases of tubercular meningitis.

Dr. Oscar Dodd, whose patient Dr. Clement reported, said that the man had been receiving progressive doses of tuberculin, and that there is considerable improvement in his condition. He called attention to two kinds of tubercular choroiditis, one kind occurring in cases of miliary tuberculosis, where the presence of tubercles in the choroid are a sign of approaching death. The cases of solitary tubercles are more

rare, and usually go on to complete healing. Usually there are no other symptoms of tuberculosis to be found. A positive tuberculin reaction is obtained, however. The patient recovers, although sometimes vision is affected. In one of his cases the tubercle was in the macular region, and central vision was destroyed.

Dr. Thomas Faith asked whether there was any change in the acuity of vision after the tuberculin test?

Dr. Charles C. Clement, in closing the discussion, stated there seemed to be no local reaction to the tuberculin given for diagnosis. These cases, he thought, are more common than is usually supposed. They ordinarily escape observation because they usually appear as terminal manifestations of general miliary tuberculosis, in which any eye symptoms are so overshadowed by the grave general condition an oculist is not consulted, and even if he should be called the tubercles may be situated so peripherally as to escape observation with the ophthalmoscope and be found only at the postmortem.

A Special Form of Proliferating Choroiditis.

Dr. E. V. L. Brown reported a special form of proliferating choroiditis occurring in a man of fifty-eight years, who was struck in the right eye thirty-five years previously by molten metal and had been blind ever since. The eye was removed for secondary glaucoma following eight weeks of severe pain. The fellow eye has never been inflamed.

The sections show a round, epithelioid and giant cell infiltration in the choroidea; the veins are thrombosed and plugged with cells and most of them completely destroyed. Older areas are almost exclusively made up of epithelioid cell proliferation. No new vessels are found. This infiltration extends over the edge of the disc and fills up a deep glaucomatous excavation, goes through the lamina cribrosa and forms a large retrolamellar round cell node. This node invades and fills the trunk of the central vein. The disc is swollen far forward. The cells also invade the retina near the disc. Some obliterative endovasculitis of the retinal vessels is present. The anterior part of the eye shows a recent organized plastic uveitis and a very recent suppurative endophthalmitis. Huge areas of choroideal pigment epithelial cell proliferation are found in front of the equator.

The unusual feature of the case is a necrosis of the infiltration in the choroidea, often in all layers, anterior to the equator, and of the adjacent Dahlen epithelial nodes which, of course, depend upon the choroidea for nutrition; the tissues over the disc are also necrotic.

Dr. Brown holds the condition is not sympathetic infiltration, because (1) the other eye was not involved, (2) the enucleated eye was never penetrated, (3) necrosis of the infiltration is present.

The process does not in any way closely resemble tuberculosis or syphilis, and stains for organisms are negative.

A very similar case has been reported by Fuchs (*Arch. f. Oph.*, p. 437), but this eye had been opened and the other eye was not inflamed. Fuchs held the condition to be a peculiar form of proliferating choroiditis, about which nothing further is known than that it is a finding similar to sympathetic infiltration, but with necrosis. The present case emphasizes the great tendency to invade and thrombose the veins, and shows that it can occur without penetrating injury.

RICHARD J. TIVNEN,
Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Meeting of February 17, 1912, in Denver. Dr. W. Hilliard presiding.

Uveitis Possibly Due to Menstrual Disturbance.

Dr. W. C. Bane presented a young woman of 20 years on account of vitreous and corneal disturbance of obscure origin. In July, 1910, she was refracted on account of headaches, corrected vision being O. D., $4\frac{1}{3}$; O. S., 4 4. In April, 1911, her distant vision became indistinct and she saw a halo around lights with her right eye. There was no pain, but a tired feeling in the eyes; and at times headache. On May 6th the vision with old glasses was O. D., $5\frac{1}{30}$; and O. S., 5 10. Six superficial punctate spots were found in the right cornea, and two in the left. The pupillary reactions were normal. The vitreous of the right eye was quite hazy. After seven weeks' treatment with dionin, mercury, potassium iodid and a general tonic the vision of the right eye had improved to 5/10. Seven months after beginning treatment, the patient having taken no medicine for two months, the vision was O. D., 5 10, and O. S., 5 10+. A change in the refractive correction gave 5 5— in each eye. On February 17, 1912, there was a slight vitreous haze, and corrected vision was 5/6 + in each eye. A possible indication as to the etiology of the case had been furnished by the patient's grandmother two days before the meeting. Following a river bath taken during her first menstrual period at the age of twelve years, menstruation had been very irregular and painful, a membranous cast being often thrown off. There was also constant leucorrheal discharge, at times very offensive. Absorption from the diseased genitalia was suggested as a cause of the eye disturbances.

Discussion.—Dr. Libby had seen a case of marked hyalitis undoubtedly caused by la grippe, which he thought to be more frequently a cause of hyalitis than was generally supposed.

Dr. Neepor discussed the use of dionin, which he favored giving every other day or less often, so as to avoid tolerance, which might result from more frequent dosage.

Glaucoma With Intraocular Hemorrhage.

Dr. Melville Black presented a man, aged 40 years, in whose left eye glaucoma had developed in July, 1911. The eye became almost blind in three weeks. Under eserin and subconjunctival injections of sodium citrate (15 minims of $4\frac{1}{2}$ per cent solution) there had been temporary reduction of tension and some relief from pain. The pupil continuing to dilate in spite of the use of eserin every two hours, a posterior sclerotomy was performed; but although pain was relieved and tension reduced, next day the anterior chamber was full of blood. This was absorbed and the eye remained quiet; but ten days ago the patient returned with tension $+2$ and the anterior chamber again full of blood. Enucleation had been advised.

Discussion.—Dr. Hosmer suggested investigation by means of transillumination of the question of intraocular tumor.

Dr. Neepor referred to a case of glaucoma in which sodium citrate had at first seemed to help but later acted as an irritant. Posterior sclerotomy was done and then an iridectomy. Vision had been practically nil for several days, but in spite of some lens disturbance had now improved to 20/30.

Dr. Bane, on ascertaining from Dr. Black that the fundus had been seen early in the case, did not regard tumor as likely, but would remove the eye.

Dr. Jackson referred to a personal case in which posterior sclerotomy had been followed by hemorrhage from the fundus, after which iridectomy had been done with advantage. He thought these hemorrhages due to the sudden reduction of tension.

Choroidal Changes Perhaps Due to Cranial Trauma.

Dr. G. F. Libby presented a man of 62 years, who gave a history of having received a blow on the occiput in 1861, and a severer head injury in 1878, after which failing vision was soon noticed. The sight had been lost in the right eye, but gradually improved in the left, which now had normal vision with $+0.75$ sph. $\pm +1.00$ cy. ax. 150° . The bridge of the nose had been crushed in 1898. The ophthalmoscope showed chorioretinal degeneration in the central region, with pigmentation in each eye, the changes being more marked in the right eye, in which they involved the macular region. There was no evidence of syphilis, which was denied. The patient stated that the improvement of vision in the left eye had been very gradual.

Discussion.—Dr. Bane thought the condition likely due to traumatic hemorrhage.

Dr. Jackson thought the history as regards the eyes was not enough to form an opinion as to the etiology.

Dr. Black suggested the possibility of a combination of choroidal rupture with hemorrhage.

Dr. Patterson, who had examined the patient with regard to specific disease, stated there was no loss of septal tissue, but a marked deflection supported a traumatic cause for the depressed bridge. The central accumulation of pigment in the affected areas favored the probability of hemorrhage.

Absorption of Old Traumatic Cataract After Iridectomy for Glaucoma.

Dr. W. A. Sedwick presented a patient whose case history had been reported to the Society in 1911, on account of the relief afforded by subconjunctival injection of sodium citrate during acute glaucoma. Since then iridectomy had been done. The man, who was 58 years of age, had had a traumatic cataract for eighteen years in this eye, the lens being quite opaque. On recently meeting the man on the street he had declared that vision was steadily improving since the iridectomy. There had not been an opportunity for detailed study of the case, but the cataract had disappeared, and the iris was tremulous. Had the capsule been accidentally ruptured in doing the iridectomy, with resulting absorption of the lens?

Discussion.—Dr. Black had thought at first that the lens might have slipped down, but the capsule could be well seen by lateral illumination. He saw the fundus well with $+7$ D.

Dr. Neepor suggested needling of the capsule.

Dr. Libby thought an increase in the opacity of the capsule likely.

Dr. Jackson did not think there could be any nucleus left, as he could see the fundus with a $+9$ lens. Remembering that the man had had the cataract since he was twenty-five or thirty years old, he probably had never had a hard nucleus in the lens. Very possibly the capsule had been touched (or cut), and this had caused the clearing. He recalled a case in which after a hard cataract had been removed from one eye a cataract had undergone absorption in the other eye.

Dr. Patterson recalled a case in which the capsule had ruptured, glaucoma had followed but the patient had refused operation, and most of the cortex had become absorbed.

Deep Linear Cauterization for Ectropion.

Dr. W. A. Sedwick reported successful results from deep linear cauterization in a case of marked bilateral ectropion. The cornea had been so hazy that the patient could scarcely read; and after doing the Ziegler puncture operation without benefit, he made a deep linear cut about 6 mm. below and parallel with the edge of the lid with the cautery knife. After that he did not see the man for four months, at the end of which time he came to report the excellence of the results. The lids were drawn up into normal apposition with the eyeballs, and the man was quite comfortable.

Discussion.—Dr. Black had seen a lot of good come from the use of massage for ten minutes night and morning in such cases.

Dr. Patterson said his operation was done by Tiffany of New York some years ago.

Dr. Jackson suggested that the cartilage had been pretty well destroyed.

Ocular Injury From Oil of Cloves.

Dr. G. F. Libby reported the case of a druggist who had broken a two dram vial of oil of cloves and received the contents in his eyes. The patient had irrigated the eyes with water and then with alcohol, and instilled adrenalin. When examined an hour later, he had severe blepharospasm, lacrimation, conjunctival edema, and pain; the right cornea was partially denuded of epithelium, and the left wholly so; the right pupil was moderately dilated and the left ad maximum. Vision, O. D., 5/30; O. S., 5/22. The treatment consisted of homatropin and holocain, each in vaselin, bandage, and rest in bed. In two days the right corneal epithelium was restored, the left nearly so; and vision was O. D., 5/9, O. S., 5/15. In another four days all discomfort had ceased. Three weeks after the injury the vision and use of the eyes were normal, but a thin linear scar remained opposite the lower pupillary space of the left eye. As the patient had used no mydriatic prior to the first examination, the mydriasis was to be attributed to the effect of the burn.

Discussion.—Dr. Neeper considered that in cases of traumatism without infection the main thing was to close the eye; using an oily solution of yellow oxid of mercury or some other oily preparation to protect the eye..

Dr. Black referred to a case of curling iron burn of the cornea in which the epithelium had been restored in twenty-four hours after applying bichlorid salve and closing the eye.

Diplobacillus Conjunctivitis After Cataract Operation.

Dr. Edward Jackson exhibited a smear, taken nineteen days after operation from an eye on which cataract extraction with iridectomy had been done. The patient was 59 years of age, and healing after operation had been uninterrupted, but for several days before the smear was prepared there had been slight but increasing discharge and conjunctival hyperemia. The smear showed Morax-Axenfeld diplobacilli in great abundance.

Sympathetic Irritation Due to Aluminum Globe.

Dr. Edward Jackson reported a case in which repeated attacks of uveal irritation had been due to the presence in the sclera of the other eye of an aluminum ball. The sight of the right eye had been lost after numerous attacks of iridocyclitis, probably specific in character. In 1909 a Mules' operation had been done by another physician, using an aluminum ball. Two years after this operation an attack of inflammation occurred in the right eye, and some time later the left began to be affected. The sclera and ball were enucleated on November 4, 1911, and the left eye had since become quiet. The aluminum ball, which was shown had become decidedly rough at a number of points, the most marked of these being at about the posterior pole of the eye, where the sclera was bulged conically. At points corresponding to the erosions of the ball were patches of crumbly degeneration of the scleral tissue next the aluminum.

Discussion.—Dr. Black had had satisfactory experience with a ball of paraffin, melting point 140° ; and thought that if Mules' operation was to be done, paraffin was the best thing to use.

Dr. Libby thought Dr. Jackson's case illustrated the superiority of enucleation over evisceration.

Dr. Bane had tried paraffin, but favored enucleation as leaving the greatest possible security against complications.

Dr. McKeown referred to the use by Lauber of fat from the belly wall.

Dr. Coover had never had success with Mules' operation. The ball usually came out. He now inserted a gold ball into the capsule.

Sarcoma of Orbit.

Dr. Edward Jackson presented specimens illustrating a case of sarcoma of the orbit. The patient, a colored woman, had been first seen in October, 1910, when she stated that her right eyelids had begun to swell four months previously. There had been a very extensive swelling in front of the right ear. The patient had also had a number of pronounced syphilitic lesions, for which she had been treated. The right eye then protruded 4 or 5 mm.; and through the thickened upper lid an edge of firm tissue could be felt under the upper orbital margin. Except that the veins were double the normal size, the fundus was normal. There was tenderness over the lacrimal gland. The patient was not seen from October, 1910, to February 5, 1912, when she returned for operation. The eye protruded about 30 mm., and was blind. Two days later the eye was removed, when the orbit was found filled with a firm immovable tumor mass. Exenteration of the orbit was then done, the periosteum stripping freely to near the apex of the orbit, which seemed free from tumor. The conjunctiva and other tissues were removed from the skin of the lids, and the lid margins cut off, including the roots of the lashes. The skin of the lids was pushed against the orbital walls. There had been steady granulation of the bone surface, with the exception of a small area over the os planum. Some suppuration persisted from the apex of the orbit.

Meeting of March 16, 1912, in Denver. Dr. E. F. Conant presiding.

Ectropion Following Pemphigus.

Dr. W. C. Bane showed, on account of ectropion which had developed in the left eye, and of beginning involvement of the right palpebral conjunctiva, a case of conjunctival pemphigus already recorded. Fairly good results had followed a plastic operation in the contracted inferior cul-de-sac, using a flap obtained from the upper part of the bulb. There was, however, ectropion of the left lower lid to an extent sufficient to cause a

good deal of annoyance from epiphora. X-ray applications had seemed to benefit the irritation, but the patient had derived the greatest comfort from occasional instillations of argyrol solution.

Discussion.—Dr. Black suggested that it would be desirable to attempt an improvement of the tear flow by removing a small V-shaped piece of tissue at and below the punctum.

Dr. Neepor thought it quite likely that the lacrimal passages were involved in the pemphigus, and that the condition of the passages should be carefully investigated before doing such an operation.

Dr. Walker would first do a grafting operation to try to bring the punctum into its proper position.

Dr. Patterson thought the operation suggested by Dr. Black would fail to leave the normal suction of the natural punctum.

Dr. Strater, who had seen a good many successful results from the use of this operation in his own practice and that of Dr. Gifford of Omaha, demonstrated the results which had been obtained by operations done on his own lower lids by Dr. Gifford. Dr. Strater also described the technic of the operation, which consisted of dilating the punctum until one blade of a pair of sharp curved scissors could be inserted with the convexity towards the eye, then turning the scissors and cutting at right angles to the edge of the lid, and again almost along the margin of the lid. The incision was really rather L- than V-shaped, and no tissue was removed, the flap being merely allowed to retract.

Mydriasis and Cycloplegia of Unknown Etiology.

Dr. D. A. Strickler presented a woman of 26 years, who gave the following history: Four years previously her husband called her attention to the fact that her left pupil was dilated. She noticed some blurring of the vision of this eye. She was treated with eserine, without benefit, and the condition had persisted ever since. There was nothing whatever in her previous record to explain the disturbance, except perhaps the fact that some months earlier she had had axillary abscesses, on which side was unknown. There was no specific or tubercular history. There was a very low refractive error, correction of which gave normal vision in this eye. There was no accommodation. The pupil reacted very slightly to light.

Discussion.—Dr. Patterson referred to a man he had seen whose pupils were very large at the first consultation, but next morning had returned to normal. His perimetric fields were full for form, but not for color, although there was no reversal or interlacing. Vision was O. D., 6/6, O. S., 6/9, without correction of low error. He would come into the office with normal pupils, and two hours later would have an attack of pain in the eyes, with the pupils large, the right more than the left. The neurologist had regarded the disturbance as purely functional.

Drs. Hess, Stilwill, Walker, Aufmwasser, and Neeper had all seen cases resembling that of Dr. Strickler.

Dr. Boyd remarked that in early pulmonary tuberculosis, of which inequality of the pupils had long been regarded as one of the early signs, the accommodation was not affected.

Dr. Jackson was interested to learn how the pupil reacted to eserine, to cocaine, and to a mydriatic.

Dr. Strickler stated that the pupil had been contracted to a "pinpoint" size by eserine in the earlier treatment.

Dr. Black considered that the condition must depend on a lesion of the ciliary ganglion, and suggested a hemorrhage into the ganglion.

Persistent Papilledema Perhaps Connected With Mastoiditis.

Drs. E. F. Conant and E. E. McKeown presented a young woman the fundus of whose left eye had presented for between two and three months a rather marked papilledema, in spite of which vision had at no time been less than 20/30 minus. She had had a discharging left middle ear for eight years, and on January 4th came in reporting that she had been dizzy for the past week. She was then unable to walk across the room without help. Corrected vision in the left eye, in which choked disc was then present, was 20/25. Next day Dr. J. M. Foster did a radical mastoid operation, exposing the lateral sinus, which was free from pus. The dizziness had greatly diminished, but was not quite gone. The ophthalmoscopic appearance had changed very little since the first examination. On January 23rd, under homatropin, the corrected vision was 20/15 minus in each eye. The vision tonight was 20/30 minus in the left eye. Headache only occurred after near work. Nystagmus was to the left. Dizziness was most marked on lying down.

Since the use of potassium iodid a marked improvement in the dizziness had occurred, and when the drug was stopped for a few days the dizziness became worse. There was apparently no nasal trouble.

Discussion.—Dr. Black stated that the results of tests he had made of bone and air conduction did not support the idea of labyrinthine disease. He would have a Wassermann test made and put the patient on mercury.

Drs. Bane, Marbourg and Strickler thought there was slight disturbance of the right disc.

Dr. Patterson recalled a case in which, with otitis media and nystagmus, there had also been papilledema.

Dr. Jackson thought intracranial trouble probable.

Dr. Neepor described a case he had seen in which the hearing had been very bad, the patient dragged both feet, and both optic nerves were involved. The case was thought one of brain abscess, but operation being regarded as impossible, iodid of potash was given, and the patient got well, except that one foot still dragged. Noguchi test had been negative.

Fulminating Albuminuric Retinitis.

Dr. G. F. Libby reported a case of rapidly fatal nephritis in which examination of the eyegrounds had given the first indication of the presence of the disease. On November 9, 1911, the patient, a man of 29 years, came for ophthalmologic examination on account of pains over the eyes and misty vision which had lasted for a week, and also slight transient conjunctival redness. Correcting lenses gave vision 5/3, with accommodation 6.5 D. in each eye. The ophthalmoscope revealed a patch of retinal edema below and to the temporal side of the right macula, and one above and to the temporal side of the left macula; and smaller spots of edema peripherally. The patient was referred to his general physician, who made a diagnosis of chronic interstitial nephritis. The blood pressure was between 180 and 220 mm. Hg. Early in December the general condition grew worse, and the areas of exudate were more marked. On the 18th of December there were small retinal hemorrhages, and left papilledema, and vision was O. D., 5/5 +; O. S., 5/9 +. The patient died suddenly a few weeks later on his way to the Riviera, the press dispatch stating that "at the time of his death he had become totally blind."

Discussion.—Dr. Neeper, who had also been consulted by the patient, stated that the latter's mother had died of Bright's disease at the age of 40.

Dr. Jackson referred to the case of a woman physician seen by him three months previously, who had at that time considered herself as in good health, but had died during the past week. The ophthalmoscopic examination had shown no edema, hemorrhage or white spots in the retina, but there was a decided narrowing and kinking of the veins, and the blood pressure at the time of examination was 230 mm. Hg. It was a case of advanced arteriosclerosis in a woman of 35 years. On the other hand, an older patient with extensive retinal changes and high blood pressure had lived several years.

Dr. Black recalled a case in which the patient died twenty days after the ophthalmic examination; and another in which after symptoms pointing to the onset of uremia, on a milk diet blood pressure of above 200 mm. had been reduced and the patient had lived for several years.

Epileptic Seizures Stopping After Refractive Correction.

Dr. E. R. Neeper reported the case of a man who had been subject to attacks of grand mal about thrice weekly, and who had been free from attacks so far for six weeks since receiving his refractive correction, with the exception of a slight seizure on the night of the day when he first wore the glasses. Twenty-two years previously he had been unconscious for several days after being struck with lightning. There had been attacks of vertigo for some time, after which no trouble was experienced till four years ago, when the vertigo reappeared, occurring about once a month for a year. Later he fell on the street with the attacks of vertigo, and still later symptoms of petit mal appeared, to be followed by the liability to complete epileptic fits. The eyegrounds were normal, and the correction was about + 1.25 D. sph. \ominus 0.75 D. cyl. with the rule in each eye. The patient's mentality appeared to be normal.

Optometric Propaganda Combined With House to House Advertising.

Dr. Edward Jackson called attention to an advertising circular which was being left from house to house in Denver by a local firm of opticians. With the circular was left also a

pamphlet issued by the American Optical Association, entitled "The Conservation of Vision and Modern Optometry," which repeatedly laid stress upon the claim of modern optometry to accurately correct optically defective eyesight without the use of drugs. The pamphlet contained a number of quotations from leading American ophthalmologists; and its arguments were presented under such headings as the following: "The use of drops is the optical novice's method," "The use of drops must be abandoned," "Optics is not taught in any American medical college," and "One ophthalmologist in a hundred knows how to prescribe accurate glasses."

ELLET O. SISSON,
Secretary.

OPHTHALMIC SECTION

ST. LOUIS MEDICAL SOCIETY.

Meeting, January 3, 1912.

Multiple Gummata at Inner Canthus Simulating Dacryocystitis.

Dr. W. H. Luedde reported the following case-history: Mrs. Z., aged 36, had been treated for several weeks by the usual methods without result. An unwarranted incision over the swollen mass at the inner canthus had been made previously at a dispensary, evidently with the hope of reducing the swelling by such drainage. It was ineffective.

Free passage of fluid to the nose on injection into either punctum, the persistence and even increase of the swelling, in spite of free drainage, together with its consistency and location, raised the suspicion of lues in the absence of any history of the disease. Small doses of K. I. proved of no avail. These had been given at the beginning before the luetic nature of the trouble was recognized. Large doses brought about a prompt and complete cure.

Congenital Absence of Both Lower Puncta—Lifelong Dacryocystitis—Apparent Cure From Dacryocystorhinostomy.¹

Dr. W. H. Luedde cited the following case-history: Absence of the puncta lacrimalis was found recorded but three times. In two of them the lower puncta were missing, as in this case.

T. G., a Greek laborer, aged 23, sustained a perforating injury to his left eye followed by panophthalmitis and enucleation. Smears from the vitreous showed diplococci, probably pneumococci, similar to those present in almost pure culture in the secretion from the lacrimal sac, indicating a probable source of infection. Examination showed the total absence of either lower punctum and its tubercle and canaliculus. The upper puncta seem normal. Double dacryocystitis has existed as long as the patient could remember. A passage in the direction of the normal canal could be probed and washed through to the lower meatus of the nose on each side, but the treat-

ment had to be intermittent and results were unsatisfactory until the direct opening into the lacrimal sac was made from the nose by Dr. Bryan. Good drainage with the cure of the chronic inflammatory process thus secured greatly increases the patient's comfort and safety. Its permanency may be doubted.

Degenerative Changes Following an Embolus in a Branch of the Inferior Temporal Retinal Artery.

Dr. W. H. Luedde stated that a clinical picture of an obstruction in the retinal artery or any of its branches is strikingly typical. The subsequent changes in the retinal tissues are not such as to greatly modify the ophthalmoscopic appearance, usually involving destruction of the ganglion cells while the outer layers of the retina remain intact. This patient, a young woman 18 years old, suffered from retinal embolism six months ago, was presented to show the secondary changes. When first seen, thirty-six hours after the first symptom of the attack, central vision was no longer impaired, but an absolute scotoma in the form of a sector or quadrant of the upper segment of the field of vision existed which has remained constant. It extends from 25° on the temporal side to 60° on the nasal side of the vertical at its periphery and is 15° across at the apex just above the point of fixation. The location of the embolus could be made out with the ophthalmoscope at the second bifurcation of the inferior temporal artery. The column of blood was broken in the vessel and in all its branches beyond this point. The area of the retina involved was defined by its pallor and edema. A week later the affected vessels were again filled, except the smaller branch at the point of bifurcation, which had supplied the retina immediately below the macula. This latter artery has gradually disappeared until now only a faint blurred trace of it remains, marked by partially absorbed blood pigment, probably the result of secondary hemorrhages into its adventitia. A few yellowish granules below the macula are the only other phenomena demonstrable which could be ascribed to this accident to the retinal circulation.

An examination into the general condition revealed a mitral stenosis, a condition often producing emboli in the general circulation. Menstruation had begun twelve hours before the

attack. The diagnosis of embolus was rendered probable by the sudden onset of complete blindness, which in a short time became partial as the plug was pushed toward the periphery, by the general findings, and by the fact that examination of the patient, who had previously presented herself for treatment several times on account of eyestrain, showed no retinal disease.

Dacryocystorhinostomy.²

Following Dr. Luedde's paper, Dr. W. C. Bryan read a paper on an operation designated by Fuchs as dacryocystorhinostomy. This operation was performed by Dr. Bryan on Dr. Luedde's patient and the patient exhibited. The operation consists essentially in making a window from the nasal side directly through to the lowest part of the lacrimal sac without in any way disturbing the dermal surface. This operation is considered as being more satisfactory in its results than extirpation of the sac, although the permanent patulousness of the window is questioned by some ophthalmologists.

Discussion.—Dr. Shahan: I would like to ask Dr. Bryan if he thinks the method employed would be effective in cases of chronic dacryocystitis in children seven or eight years old.

Dr. Green: About eighteen months ago a patient entered the City Hospital with an extensive lacerated wound of the lower lid, sustained in a drunken brawl. There was an irregular wound which passed through the lower canaliculus and extended 4 cm. down and out on the cheek. After the primary swelling had subsided I sutured the cut edges, obtaining primary union throughout. At the operation I was unable to find the inner cut end of the lower canaliculus, so that when healing was complete there was an annoying epiphora. A probe entered through the upper canaliculus encountered a fibrous band at the entrance to the bony duct. I made an opening in the conjunctiva just at the base of the caruncle, and thence by scissors dissection worked my way into the sac. Through this opening a silver style corresponding to Bowman's 6 was passed into the bony duct and allowed to remain in situ one month. One week after its removal I was chagrined to find that the artificial opening had closed. As the patient was compelled to remove from the city, I was unable to follow up the case.

I believe that with a large direct opening into the sac (as in the operation performed by Dr. Bryan) an artificial canaliculus would be more likely to remain patulous, and I should be inclined to advise dacryocystorhinostomy in a case similar to the one cited.

Dr. Bryan: I cannot speak with any feeling of assurance about children. I do not know that they differ from adults, and I should think a well drained sac might even work with them as with older persons. Dr. Green's case might be satisfactorily treated if the drainage could be made as free as it seems to be in the case under consideration.

J. G. CALHOUN,
Section Editor.

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1. See page 493, this issue.
 2. See page 497, this issue.

PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

Meeting of January 11, 1912. Dr. William Campbell Posey
in the chair.

The Influence of Glasses in the Correction of Strabismus.

Dr. D. Forest Harbridge: In concomitant squint, whatever the real determining factor may be, there is ever present, relatively at least, either an insufficiency or excessive action of opposing muscles. A certain number are explained by the presence of anomalous anatomic conditions, congenital amblyopia, etc.

The two theories commanding the most serious consideration are Donder's and Worth's. So constant is the relationship of esotropia with hyperopia, and exotropia with myopia, that it may be considered the rule, thus favoring Donder. Worth's theory can be supported in a measure, but if proper correcting lenses be used it seems fusion should follow naturally.

The varieties of convergent squint in which the application of correcting lenses operate favorably are permanent monocular and periodic squint. Correcting lenses may be ordered even as early as the eighteenth month.

Dr. Posey said that Worth's theory of a fusion center was purely hypothetic and quite unnecessary, as the physiologic phenomena enacted by the true anatomic centers governing the muscles which were concerned with the extraocular movements were sufficient to account for the fusion faculty.

He was averse to glassing children under three years of age, on account of the probable danger of the pressure of the spectacles interfering with the development of the bones of the face. This objection might be purely theoretic, and he was ready to be convinced of the falsity of his belief by the actual experience of others. He dwelt upon the necessity of differentiating between concomitant and true congenital squint, as in the latter class of cases orthoptic training was useless and operation the only means of straightening the eyes.

Dr. Zentmayer: Worth's theory of the causation of squint received its confirmation largely from the results secured from his excellent device, the amblyoscope, and yet the principle of its construction and the methods of its use whereby these results are attained are the very ones that would aid in the restoration of parallelism of the visual axes in cases of concomitant squint, whether it be caused by incoordination between accommodation and convergence, or by failure of development of the fusion center. The theory of Donder agrees with the facts, and in the exceptional cases of convergent squint associated with myopia less than 3 per cent are probably due to other causes enumerated by the essayist, together with the fact that in a few of these cases this association was observed in adults, and as we know that hyperopia sometimes goes over into myopia, there is no proof but that these were originally of the class of convergent squint with hyperopia.

As would be expected from the cause of convergent squint, if the glasses correcting the refraction error are placed upon the child as soon as the squint begins to show itself, and this is usually not before the age of two years, the visual axes become parallel and remain so as long as the glasses are worn. If there is delay until the deviating eye becomes amblyopic, the angle of the squint is lessened by the glasses, but because of poor fixation in the squinting eye parallelism is not fully restored.

In answer to a query why there was at times divergence of the visual axes, with but slight error of refraction, Dr. Posey stated that there were often anatomic peculiarities within the orbit which might account for the divergence, and cited a case where an X-ray study of a skull showed encroachment of an unusually wide ethmoid upon both orbits.

Tuberculosis of the Conjunctiva and Sclera Following Removal of a Pigmented Papilloma of Conjunctiva.

Dr. Luther Peter reported the history of a girl of Cuban extraction, 13 years of age. There was a congenital brownish pigmented area in the conjunctiva of O. D., 2 mm. from the outer limbus, triangular in shape, with base in. The pigment was slightly elevated and moved freely with the conjunctiva. Removed April 26th, 1911, under cocain anesthesia. On May 2d the wound had healed, with considerable residual

redness and slight thickening of the conjunctiva. By May 13th the area of redness had increased to about 12 mm. in diameter. The color was now of a salmon tint. Visual fields and eye-grounds entirely normal.

The pathologic report was pigmented papilloma. About one month after operation the patch showed an increase in diameter and elevation and contained two foci of ulceration. To the palpating finger the thickened area was decidedly firm and somewhat gritty. After consultation with Dr. Wendell Reber it was decided to remove a section of the diseased area to determine the nature of the process. Drs. Rosenberger and Roddy reported a tuberculous process. Careful physical examination and search for tubercle bacilli in the sputum, urine and feces failed to reveal any foci of disease other than the eye. There was a history of tuberculosis in both maternal grandparents and maternal aunt, otherwise the family history was negative. On July 6th tuberculin was administered, the initial dose containing 0.01 mg. of the solid tubercle bacilli. A mild reaction followed. Tuberculin was now administered at intervals; in ten days the improvement was noticeable. Incidentally, one month after the use of the tuberculin, the child developed a well marked attack of chorea; otherwise her general health has improved with the local improvement. The appearance now is that of a localized episcleritis of a faint brownish tint, fading into a pale pink in the periphery.

Special interest centers in the etiology of the second growth. Possible inoculation from an external source at or after the time of operation may be called into question, although as all precautions were taken, I think inoculation at the time of the operation may be eliminated. The home surroundings were sanitary, and the eye was carefully bandaged for several weeks after operation. It is altogether probable that the contused site of operation furnished a good soil for a growth from an internal focus. It is not likely that so small a nidus of tuberculosis would produce so marked or, in fact, any general reaction to tuberculin. I believe, therefore, it is fair to conclude that this lesion was secondary to an old internal focus of tuberculosis.

Dr. Posey said it would be interesting to ascertain if the patient had any negro blood, as the nonresistance of the negro to tuberculosis is a matter of daily clinical evidence. He

thought .01 mg. of tuberculin too high for the initial dose, and said that he began with 1/500 mg., using von Hippel's method.

Neither Dr. Posey nor Dr. Zentmayer had ever seen chorea develop after tuberculosis of the eyes.

Dionin in Ocular Therapeutics.

Dr. Leighton F. Appleman read a paper on Dionin as a Factor in Ocular Therapeutics.

Dr. Posey said that though he had used dionin as a routine measure in much the same manner as Dr. Appleman had advised, he had never as yet been persuaded of the actual value of the drug. Were it as potent to clear opacities as was vaunted, why did slight haze of the cornea not yield at once to its application? In corneal conditions he had much more confidence in the use of yellow oxid of mercury salve, as an absorbifacient, than in dionin. He did think, however, that dionin was of advantage in obtaining the maximum action of atropin in the treatment of iritis, provided the former drug was administered fifteen or twenty minutes before the mydriatic.

Dr. Zentmayer said that on the whole his views coincided with those expressed by Dr. Posey. He had used dionin routinely since it was first brought to our attention, and as the result of this experience he would be led to conclude that with the exception of aiding in the absorption of recent exudates, such as interstitial keratitis and infected corneal ulcerations, and in clearing corneal opacities, no marked results could be expected from its employment. He thinks that possibly it relieves to a degree the pain of uveal inflammations.

Dr. Harbridge said it was a point of interest to know whether the use of dionin in cases of subconjunctival hemorrhage really did lessen the time of absorption. He questioned whether or not some of the other mildly irritating drugs would not effect the same results as claimed for dionin.

Meeting February 8, 1912. The President, Dr. Wendell Reber, in the chair.

Trichloracetic Acid in the Treatment of Corneal Ulcers.

Dr. W. W. Watson: Trichloracetic acid, a monobasic, crystalline, organic acid, discovered by Dumas in 1838 and made official in 1890, is a powerful caustic, and in aqueous solution

is used in the treatment of corneal ulcers. Applied with care, the solution of five to twenty-five per cent strength is very beneficial in inhibiting germ proliferation without destroying cell life. The haziness of the cornea which follows the application clears up in one to twenty-four hours with no unfavorable symptoms. If hypopyon is marked, apply a strong solution daily, but for most purposes the weaker strength should be selected with repeated applications.

The acid is to be preferred to ointments and collyria, as it is easier for the patient and more certain; it has the advantage over operation in that it offers no opportunity for further infection through fresh wounds, and excels the thermocautery in that it does not destroy adjoining healthy tissues.

The acid checks the liability to corneal perforation, and compared with other caustics lessens corneal opacity.

Hypopyon Ulcer of the Cornea Treated by Corneal Incision.

Dr. Charles E. Shannon exhibited a case of hypopyon ulcer of the cornea that had been treated by corneal incision.

A laborer, 50 years old, had some lime splashed into his right eye, severely burning the cornea. Despite prompt and energetic treatment, an extensive purulent ulcer with marked hypopyon developed in the course of five days. Operative treatment was deemed expedient, in view of the rapidly increasing hypopyon, and under cocain anesthesia an incision was made in healthy corneal tissue with a narrow Graefe knife, immediately below the site of the ulcer. This was followed by the complete evacuation of the inflammatory exudate. Within two days the wound had healed and the anterior chamber reformed; and within ten days the ulcer was completely covered with epithelium. The final result was perfect, the cornea showing only a fine diffuse scar.

Discussion.—Dr. D. Forest Harbridge had had but little experience with trichloroacetic acid, having used the pure drug only, in a limited number of seriously infected cases. Regarding Saemisch's incision, Dr. Harbridge said it had been several years since he last performed this operation. He felt it to be a very destructive procedure, and if the incision be made in healthy tissue as far away from the pupillary area as possible, the results would be just as effective. He prefers employing a keratome, believing that the wound made by this

instrument heals better and quicker. He makes the incision just inside the limbus; if necessary it may be repeated at intervals of a few days. He believed the draining of the anterior chamber in itself beneficial to the healing of an ulcer as well as the removal of the hypopyon. Often malnutrition is a contributing factor in the development of hypopyon ulcers, or at least people who are underfed are more susceptible after slight damage to the cornea.

Dr. Wendell Reber: Ulcers are generally classed as simple, infected, complicated and perforated. Simple ulcers that follow after foreign bodies in the cornea almost always take care of themselves. In infected ulcer with infiltrated edges atropia and hot stupes are invariably indicated. It is wise to administer internal treatment at the same time. Calomel should be given because it assists the blood in manufacturing antibodies to resist the infection. The complicated ulcer is the one which is being discussed this afternoon. Tincture of iodine, carbolic acid or 1 per cent formalin may be used. I may say that my use of trichloroacetic acid has been in 25 per cent solution; I once used it pure. It is difficult for me to persuade myself that it does as well as some other remedies. It is highly diffusive, it is very hygroscopic, and it attracts some of the moisture away from the normal cells, so that it is open, at least partially, to objection. Carbolic acid is even more strongly to be avoided, in my estimation, than trichloroacetic acid, and one must have a very delicate touch to use carbolic acid safely, as the acid is apt to be deposited where it is not intended. The organic silver solutions have almost gone out of vogue, but if you will read the old authors you will see how much they were used. Tincture of iodine, as far as my information goes, does not damage normal conditions, nor is the pain very bad from it, particularly if an application of ice follows immediately after the application of the iodine. I took the trouble once, after using trichloroacetic acid, to stain with fluorescein, and much of the corneal tissue whitened by the acid took the stain.

One per cent formalin appeals to me for three reasons: First, it will not damage normal corneal tissue; second, it does not extend to normal corneal tissues; third, it toughens the very membrane you wish to keep intact.

A young woman in the Samaritan Hospital with Neisser's conjunctivitis had a large hypopyon. She received daily local

treatment of iodine, and internally had serum treatment, with biniodide of mercury, quinine, iron and strychnine. We saved her cornea without an operation, but the floor of the ulcer was very weak and began to bulge. One per cent of formalin was applied daily for a week, and the contour of the cornea became normal. I cannot help but think that the formalin was of value in toughening up the thinned corneal walls. I agree with Dr. Shannon in the belief that an incision in the normal corneal tissue is superior to the Saemisch incision through the ulcer itself.

Dr. Charles R. Heed: I have recently treated two badly infected ulcers with considerable hypopyon. On one case I did a corneal incision below. He had considerable pus, but the wound healed almost immediately. In the other case Dr. Sweet had tried chemical treatment (iodine), but the hypopyon increased. The eyeball would have been lost if he had not done a corneal incision. I saw the patient less than a week ago, and his eye was saved. He has a very good eye, ocular tension is normal, and in time, if he should lose the other eye, we could do an iridectomy and he would have quite good sight.

Many of the cases of hypopyon ulcer we get at the Wills Hospital come from the anthracite coal mines. They will certainly perforate if you don't relieve the tension. I rather condemn the Saemisch section. You are apt to take away a large part of the corneal tissue and pull out the floor of the ulcer with it. Naturally there is always iritis with hypopyon ulcer.

Subconjunctival Hemorrhage.

Dr. Harbridge stated that during the past month he had had four opportunities to test dionin in four cases of subconjunctival ecchymosis. Three were cases of moderate spontaneous hemorrhage. One absorbed in four days. The second increased the first three days, finally absorbing in thirteen days after the onset. In the third, the normal eye being taken as a control, and no dionin being used, absorption took place in fifteen days. The fourth, a very extensive traumatic hemorrhage, seen four days after injury, absorbed in twenty days (twenty-four days after injury), leaving a yellowish discoloration such as is frequently observed following extensive hemorrhage. Dr. Harbridge was somewhat skeptical as to the value of the drug in such cases.

Dr. Reber: I do not believe in the indiscriminate use of dionin, but in new or fresh subconjunctival hemorrhages it seems to be of much value. I insist, however, that the subconjunctival extravasation be not over twenty-four hours old when dionin is used. After that time hematoidin deposit delays the action of the drug. To assist in relieving the pain of iritis, I believe in dionin. To assist the action of atropia in such cases, I believe in it. To promote the absorption of post-operative debris, I believe in it. To hasten the absorption of a recent corneal scar, I believe in it. Its effect rapidly diminishes after the first week, when it should be supplanted by subconjunctival injections of normal saline, or yellow oxid of mercury salve. All three of these agents promote lymphatosis and are at times interchangeable in their effect. Finally, as I pointed out some years ago, in one of the first papers in this country on dionin, in those rare cases of glaucoma following certain cases of iritis, when we are undecided as to whether we should resort to miotics or mydratics, dionin is an admirable therapeutic straddle.

Meeting of March 14, 1912. Dr. Wendell Reber in the chair.

Optic Neuritis and Left Nerve Palsy of Specific Origin.

Dr. John H. W. Rhein presented a woman, aged 50, with headache and failing vision dating from January 2, 1911. Paresis of the left external rectus and moderate optic neuritis, which was more marked on the left side. Face and hands very large, suggesting acromegaly. There was no paralysis of any of the cranial nerves. Station good and gait normal. The grasps were equal and good, and there was no evidence of any paralysis of motion or sensation. Slight exophthalmus of the left eye; left palpebral fissure wider than the right.

Positive Wassermann and von Pirquet. Skiagraph negative. Salvarsan injection on December 22, 1911, and gradual improvement in the paralysis of the external rectus began the next day.

A tumor of the brain was at first suspected in this case. The face and hands suggested acromegaly, but this was neither confirmed by the skiagraph nor the subsequent study of the case, as the patient was quite positive that the face and hands had always been large and that there had been no recent perceptible increase in size.

In view of the presence of a positive Wassermann reaction, the case was looked upon as one of syphilitic meningitis, and the improvement of the paralysis of the external rectus muscle following the salvarsan injection was looked upon as confirmatory evidence of this diagnosis.

Leber's Disease.

Dr. Rhein also presented a case of Leber's atrophy.

Discussion.—Dr. William Campbell Posey considered the first case to be one of cerebrospinal syphilis. Both optic nerves were considerably inflamed, the left being the more so. The paralysis of the external rectus was complete. There had been no inflammation of the iris or ciliary body; this was unusual in cerebrospinal syphilis.

He was much interested in the third case reported by Dr. Rhein, and thought it was probably one of hereditary optic nerve atrophy. Some years ago he had observed this affection in three generations of the same family, the patients being a young man of 21 years of age, an uncle about 45 years of age, and a greatuncle about 65 years of age. All three had vision in each eye of about 3/60, the center of the field of vision being occupied by a large central scotoma. Owing to the appearance of the atrophy at a period when the sutures of the skull were becoming firmly ossified, he had advanced the theory some years ago that the retrobulbar neuritis occasioning blindness could be accounted for by preternaturally small optic foramina, in consequence of some anomaly in the development of the sphenoid bone. To substantiate this theory, Dr. Posey said he had taken measurements of the skulls of the patients before mentioned, which seemed to indicate some faulty development of the skull. It is the general belief that the disease is transmitted through the female side of the affected families, but that only the male members develop the atrophy.

Dr. Zentmayer said that hereditary optic atrophy certainly did appear in female members of a family, but not in a very large per cent.

Dr. D. Forest Harbridge, referring to the case of Leber's atrophy presented by Dr. Rhein, added the following history:

William and David B., ages respectively 22 and 24, with

good personal history. The younger brother first developed symptoms of failing vision with a positive scotoma early in November, 1910. The older brother early in May, 1911. When first seen by Dr. Harbridge, early in August, 1911, they presented clearly defined discs. The upper and lower borders slightly hazy, atrophic and decidedly pale to the temporal side. The vessels were moderately reduced. The general character of the fields, taken at different intervals, showed a more or less concentric reduction with large absolute scotoma. In one a broken ring zone of functioning retina, the balance being lost.

Vision—William, fingers at 6 inches. David, $1\frac{1}{2}/60$. Wassermann negative. Both were treated actively in the Chester Hospital for six months. Vision improved to $3/60$, fields remaining practically the same. Immediately following the use of nitrite of amyl there was no appreciable difference in the size of the vessels. During their stay in the hospital William developed a severe attack of typhoid fever, and for two weeks during this period was absolutely blind.

Dr. Howard F. Pyfer stated that there was in Norristown a family with undoubted hereditary optic atrophy. The history of this family has been traced back as far as 1780. The males have inherited the disease through the female side of the family. No females, as far as I am aware, have this disease.

I have had an opportunity of examining a patient who has become a victim to this disease. He first had edema and congestion, going on to a gray discoloration of the nervehead and finally optic atrophy.

Blindness is not complete in any of these men, but at night, unless they travel along well-known routes, they easily become lost.

Dr. Wendell Reber: I think there are more of these histories than we suspect. There are certain anomalous forms that do not correspond to the type. It may be that when we know more about this disease we shall find it answers to the law of the Mendelian theory. The family history is extremely hard to elicit, and we often will be misled by the histories. There is a disposition of the disease to show itself soon after puberty or not until about 45 or 50.

The Therapeutics of Diseases of the Lacrimal Apparatus.

Dr. William Zentmayer advised that in atresia of the lacrimonasal duct a probe be passed through the duct into the nose. Only lately he had seen a dacryocystitis in a child $2\frac{1}{2}$ years old, where the atresia had been left to nature to cure. His attention had been called by Dr. Dewey to an occasional epiphora, the result of wearing a "shure-on" nose piece and similar forms of nose glasses. When the fingerpieces are released the lower lid is drawn away from the globe so that the punctum does not lie against the ball. He asked: "Shall the treatment of lacrimal obstruction and its sequelæ be conservative or radical?" Answering it by saying that in the beginning of the trouble it could not be too conservative, while in the later stages it should be radical. In simple obstruction the entire tract should be syringed out with a mild astringent lotion by introducing for a very short distance into the canaliculus the end of a fine gold canula. The point should not be sharp, as there is danger of lacerating the tissues and thus allowing the solution to get into the cellular tissues. If this fails to relieve the condition, careful probing is to be tried after clipping up the canaliculus. He uses the Bowman probe, rarely above a No. 4. If a fine probe has been used it is better not to follow with syringing, because of the danger of orbital cellulitis should any of the solution enter the orbit. The injection of silver solutions is not advised. In the presence of dacryocystitis, the same measures are to be tried, and only after a thorough trial is extirpation of the sac advised. If a mucocele has been formed, extirpation should be done at once. If an operation that opens the eyeball is contemplated, extirpation may be done for even slight dacryocystitis. In acute dacryocystitis the abscess should be opened with a free incision, carried into the posterior wall of the sac. He considers it unsurgical to introduce lead styles into an abscessed sac in the acute stage. While extirpation of the sac is a very satisfactory operation in pus cases, it should not be done for simple obstruction due to stricture, as in quite a considerable percentage of cases there is annoying epiphora for some time following the operation, and in a few cases it is permanent, consequently little has been gained by the procedure. However, in one such case a cure was obtained by the use of the actual cautery in the canaliculus.

It is of the utmost importance that intranasal treatment should be carried out in connection with the treatment of all disc conditions of the lacrimal apparatus, and antisyphilitic treatment should be added in children.

Discussion.—Dr. S. D. Risley: While there is much diversity of view maintained by different ophthalmic surgeons regarding the treatment of this very common affection, my own views as to methods are quite closely in accord with those outlined by Dr. Zentmayer. He has always been an advocate of conservative methods in the treatment of diseases of the lacrimal drainage system, and still believe that much of its reputation for chronicity depends upon faulty and violent procedures for its relief.

For many years past he has employed probes only in exceptional cases, and rarely finds it necessary to extirpate the lacrimal sac. In the minor cases of partial retention of the tears, he has found that to dilate the lower punctum without violence, after the instillation of cocain, sufficient to admit the point of the fine gold canula of the lacrimal syringe he has devised, that the sac can be thoroughly irrigated with any desired solution. If the solution does not flow to the nostril a few drops of a solution of cocain and adrenal chlorid carried into the sac and allowed to remain there a few moments, will contract the tissues and permit the passage of fluids into the nostrils, without the passage of a probe. A cure in a large percentage of cases could be effected in a short time by this simple procedure. If fluids cannot be made to pass through the duct in this way he thinks the lower canaliculus should be carefully slit up to or near where the canaliculus enters the sac, but not into the sac. A small probe, not larger than a number 3 or 4 Bowman, can then be carefully carried into the sac and thence to the entrance of the nasal duct and through it into the nose. There is always danger in this procedure lest the inflamed and more or less friable mucous lining of the irregular bony walls of the duct be torn or pierced. He thinks this is far more likely to occur with a number 1 probe of the Bowman series than with a number 3 or 4. After the safe passage of the probe the walls of the duct should be irrigated with some mild, unirritating alkaline wash. If pus is present in the sac, after thorough washing, he finds weak solutions of silver nitrate, not stronger than one grain to the ounce, of great service in disinfecting the

sac and duct. It should not be allowed to remain in the closed sac very long, but after a moment or two carefully washed away or neutralized by the alkaline wash. The nostrils in every case of lacrimal disease should receive careful attention. In chronic dacryocystitis, in cases of thickening of the sac walls, where there is accumulations of a glairy mucoid discharge, he has found frequent irrigation of the sac with weak solutions of iodine of great benefit. This solution he secured by a few drops of Lugol's solution of iodine in water. He never passes a large probe and never uses styles, but often in former years, when they were so much in vogue at the hands of the general surgeon, has had occasion to remove them.

Dr. Posey said his treatment followed much the same line as that laid down by Dr. Zentmayer and Dr. Risley. He has, however, relinquished the use of probes for many years, preferring the insertion of styles and the removal of the sac. It was his practice in cases complaining simply of increased lachrimation, to try simple syringing of the lacrimal passages for a time, but if this treatment failed, styles were inserted.

He called attention to the importance of properly entering the sac in the performance of Bowman's operation, and said that Weber knives with curved tips were to be discarded for those with straight tips. Operators should be careful to see that the lower canaliculus is kept open by permitting the head of the style to rest securely in the sulcus. He removes the style after three or four months, and if the lachrimation still persists, he then advises the removal of the sac. This latter is his operation of choice also in all cases of mucœcele.

In acute dacryocystitis he incises the the lower canaliculus and puts in a style while the patient is under general anesthesia, thereby affording not only relief to the conditions excited by the abscess, but also removing the cause. He thinks that the style permits drainage, and in many years of experience with this procedure he has had only the best results.

He cautions against syringing out the sac with any but the simplest solutions, and said he had once observed optic atrophy arise in the practice of another, from orbital cellulitis set up by washing with a solution of nitrate of silver.

Dr. Reber said that chronic dacryocystitis is generally a very much treated dacryocystitis.

Meeting of April 11, 1912. Dr. Wendell Reber in the chair.

Tuberculosis of the Eye.

Dr. George Derby, of Boston, Mass., spoke by request on "The Treatment of Tuberculosis of the Eye." About four or five years ago we established a class for the treatment of tuberculosis of the eye at the Massachusetts General Hospital. We have a large clinic and get a number of cases, so that it is worth while having a special organization. We have perhaps fifteen patients in the active stage of the disease coming at a time. We have handled 140 cases since starting four years ago. The manner in which the class is run does not differ from the ordinary tuberculosis class. The cases are referred to us from the various clinics, sometimes with a diagnosis and sometimes without a diagnosis. We then send them to the hospital and observe them. They are given the tuberculin test and watched for reaction in the eye. Having made the diagnosis the patient is registered in the class. The case is treated by the general medical man and an ophthalmologist. A social worker looks after the patient outdoors. We have a nurse who weighs the patient. In acute cases we insist on their keeping outdoors most of the time and some of them sleeping there. The most severe cases are not very satisfactory to treat at home, and during the last two years we have treated them at the hospital. Sometimes we send them to a sanitarium.

Those that are treated at home are made to keep a book and state in it how many hours they are outdoors and how much they eat. They take their own temperature and record that in the book. Very few of these patients run a temperature. We make them take an extra amount of nourishment.

I think tuberculin should be used very carefully indeed. We use a filtration, ordinarily using about $\frac{1}{10000}$ of a mg., watching their general symptoms and taking their temperature. We have had somewhere around 140 cases, and the results have been very satisfactory.

Discussion—Dr. Posey asked if they had many negroes in this class, as he believed that tuberculosis of the eyes was particularly common among the negroes, that the worst cases he had ever seen were among them.

Dr. Derby said they had had a colored man with tubercular conjunctivitis and a colored boy with phlyctenulosis.

Miotics in the Treatment of Chronic Noninflammatory Glaucoma.

Dr. Posey said that he continued to be impressed with the value of miotics in the treatment of glaucoma, although he wished to caution against their permanent employment in any but the noninflammatory forms of this disease. To obtain good results from miotics, they should be used four times daily without interruption, the pupil being maintained at almost pin-point contraction the entire time. Conjunctival irritation should be avoided by carefully and repeatedly cleansing the conjunctival sac with boracic acid lotion fifteen minutes prior to the instillation of the miotics and by exercising the greatest care in the preparation and renewal of the drugs, nothing but sterile solutions being used. Droppers should be repeatedly boiled and at all times kept perfectly clean. It is well to employ but weak solutions of pilocarpin and eserine at the commencement of treatment, to avoid spasm of the ciliary muscle and iris, pilocarpin gr. $1/5$ to the ounce being first employed and the dose gradually strengthened until at the end of twelve months the pilocarpin is used in a strength of two grains to the ounce, eserine in half that dosage. It was his custom to employ pilocarpin through the day, but eserine at bedtime. If miotics were used in this way, their effect upon the conservation of vision was remarkable, and recent observations had confirmed his original studies, that no form of operation equaled the results obtained by their use in chronic glaucoma.

Discussion.—Dr. Zentmayer said that there is a large class of patients in which it was manifestly impossible to carry out a line of treatment that required the care called for in the miotic treatment. This applies particularly to dispensary patients, and except in those well advanced in years this method has no place. He would advise operative treatment in an individual under fifty years of age in any station of life, because it is too much to expect of any one to persist in such discipline for the rest of his life. In some cases, however, where iridectomy is impossible or where from the nature of the visual field it would seem hazardous to perform it, the miotic treatment would be indicated in the aged, or cyclodialysis in younger individuals. Of the filtration operations he prefers the La Grange. It requires no special instruments, gives a large cicatrix and the incision is so placed that it opens up the angle of

the anterior chamber and also communicates with the supra-choroidal space.

Dr. Reber: I can only repeat several things that were brought out yesterday before the class. There are three phases of glaucoma. The first class is the one that frankly calls for operation, and we have only to decide what operation shall be done. The second class does well on miotics. Thirteen years is the longest I have ever had a patient keep up the use of miotics. This was one of the few cases I have ever known where the patient really was careful all the time in the use of the miotics. The third class is made up of the doubtful cases of noninflammatory glaucoma with gradually diminishing vision and slowly contracting visual fields. It is one of the nicest points in surgical judgment to determine sometimes whether such cases shall take the risk of operation. If operation is decided on, my own preference would be for some form of trephine operation.

Hunt-Tansley Operation for Ptosis.

Dr. Reber presented two cases of ptosis on whom the Hunt-Tansley operation had been done—one in a bilateral ophthalmoplegia, and one in a posttraumatic ptosis. In both the results were particularly good. He briefly reviewed the history of the operation and stated his preference for the method mentioned. In replying to the inquiry of Dr. Zentmayer, Dr. Reber stated that he denuded the cutaneous flap of its epidermis.

Meeting of May 9, 1912. Dr. Wendell Reber in the chair.

General Manifestations of Arteriosclerosis.

Dr. Max R. Goepp stated that arteriosclerosis may be classified under two general heads, mechanical and toxic. Arteriosclerosis is attributed to hard work, either manual labor or brain work, associated with worry. Men are more subject to arteriosclerosis than are women, and the overindulgence of many men, in both eating and drinking and also in working, are contributory causes to this condition.

That arteriosclerosis is brought about by toxins in the body is a proven fact, but just how this condition comes about is not clearly defined. There are the two forms of arteriosclerosis,

senile and diffuse, to which may be added the nodular form of Councilman.

As one of the clinical manifestations mention was made of a feeling of tingling and numbness of the extremities, formication, particularly in the arms and hands. The dizziness which is so commonly observed in arteriosclerosis may be the direct effect of cerebral anemia, due to degeneration of the cerebral vessels, or a secondary result of the digestive disturbances which are quite commonly present.

The brachial artery is the least frequent artery to be affected.

Medicine owes a debt of gratitude to the ophthalmologists for the development of the study of the retinal vessels, which is so valuable in the study of the early diagnosis of general arteriosclerosis. The great advance in the study of the blood pressure has been a contributory factor in its study. It is by means of the diastolic pressure that we are able to separate the ventricular from the vasomotor factor, and therefore correctly determine to what extent the blood vessels alone are responsible for the hypertension.

The normal pulse pressure, that is the difference between systolic and diastolic readings (which represents the force of the ventricular contractions) is equal to from 40 to 50 or 55 mm. of mercury. A reading in excess of this indicates cardiac hypertrophy; while a pulse pressure below 40 mm. should at least arouse the suspicion of cardiac insufficiency.

In his summary of the various forms of arteriosclerosis, he described—

1. Renal: The association of chronic interstitial nephritis and general arteriosclerosis is so common that one generally suggests the other. Patients suffering from typical chronic Bright's disease practically always present the signs of arterial degeneration. These patients are particularly prone to apoplexy from hemorrhage or thrombosis.

2. The cardiac form presenting the picture of myocarditis and cardiac asthenia, or that of angina pectoris or both.

3. The cerebral form, with special localizations presenting symptoms of cerebral anemia and more gradual destruction of brain tissue. It should be remembered that epilepsy developing late in life may be a manifestation of cerebral arteriosclerosis.

4. Arteriosclerosis of the extremities which is most commonly observed in laboring men.

5. Emphysema and bronchitis with arteriosclerosis of the pulmonary artery and hypertrophy especially of the right ventricle are also seen chiefly in the laboring class.

6. Mesenteric form.

Ocular Manifestations of Arteriosclerosis.

Dr. D. Forrest Harbridge said that truly grave vascular changes may be present, but lacking subjective evidence, thus escaping observation unless the patient consults the physician for some other intercurrent condition. It does not always follow that because we have vascular disease of one system of vessels, that all others in the human economy are similarly involved.

For clinical purposes we may conveniently arrange vascular disturbance manifesting itself in the eye, as affecting external parts: subconjunctival hemorrhage, paresis of the extraocular muscles due to intracranial hemorrhage secondary to arteriosclerosis, those conditions resulting from the pressure of a sclerosed vessel upon the optic nerve or other delicate structures. As affecting internal parts, the circulatory system of the fundus. All impair more or less seriously the function of the eye, and act as a strong index to the welfare of the general economy.

Regarding the earliest evidences which are strongly suggestive of vascular change, is the presence of corkscrew retinal artery twigs, particularly out toward the macular region, a dull red nerve head, flattening of the veins at artery crossings, sluggish pupillary reaction, early failure of accommodation, partial or complete senile circle in the cornea, persistent headache in spite of careful refraction, particularly at the beginning of presbyopia, and a history of more or less frequent attacks of gastric or bronchial disturbances which make the patient really sicker than the conditions would seem to warrant.

The pathognomonic evidence of arteriosclerosis presents all or at least many of the following conditions. Change in course, size, and irregular caliber of the arteries and veins. The latter being indented at artery crossings. Altered vascular reflexes, such as a brilliant central light streak (silver wire artery), undue fullness of the perivascular lymph sheaths and paleness of the vessels. In more advanced cases a few faint hemorrhages. Retinal haze, more marked about the nerve head.

Discussion.—Dr. Posey said that the importance of a careful examination of the fundus could not be overestimated in the consideration of all cases of vascular sclerosis. He would refer, however, to but one phase of the subject, one to which he had first called attention in 1902, namely, to transient monocular blindness in consequence of changes in the walls of the retinal vessels. In cases exhibiting this symptom the attacks of blindness usually lasted from ten to fifteen minutes but he had observed one case where the blindness had persisted, though with intervals of remission, for five or six hours. While at the time of the attacks there were all the signs of retinal ischemia, the retina regained its normal appearance after the blindness had passed. He was convinced that many cases of permanent blindness which in earlier years had been attributed to embolus of the central artery of the retina, were really of a thrombotic nature, or perhaps due to a mere spasm of the walls of the artery, and cited the classic case of Leber's, in which there were all the ophthalmic signs of embolus, but in which the microscope failed to reveal any evidence of either embolism or thrombosis. Dr. Posey said, however, that in spite of this experience, he was of the opinion that changes in the intima of the vessels must in most cases be the exciting cause of the spasm. He dwelt upon the prognosis, not only for vision in the affected eye, but also as regards the life of the patient, and said that while vision might be maintained for many years in eyes the seat of even repeated attacks, that final blindness was to be dreaded on account of the thrombotic changes. Several of the patients whom he has observed had died some years later from vascular disease of the brain. He would, therefore, insist upon a treatment and a regimen to control arterial sclerosis in all cases.

Dr. Zentmayer recalled the remarkable case of spasm of the central artery of the retina reported by Dr. Harbridge, through whose courtesy many of the ophthalmologists of Philadelphia had had the opportunity to witness the cycle of events connected with this phenomenon, namely, the gradual extinction of the arterial circulation accompanied by a loss of vision and dilatation of the pupil, followed after a varied period of time by a return of the arterial circulation, a restoration of vision and contraction of the pupil.

In connection with the retinal manifestations of arteriosclerosis he thought more emphasis should have been placed on the fact that the irregularity in the caliber of the vessels was much more pronounced in the veins, and that not only was the light streak on the arteries more brilliant, but it could be traced much farther out from the disc than normally, and that local edema was often present at a point of crossing of an artery and a vein.

The red "hot eye" was frequently seen in arteriosclerosis, especially in the presence of a gouty diathesis. A persistent asthenopia was often associated with arteriosclerosis. Optic atrophy accompanied by a loss of the superior or inferior half of the field had been attributed to pressure of the hardened ophthalmic artery upon the optic nerve, causing it to be further compressed by the dural sheath at the optic foramen. Other types of atrophy due to arteriosclerosis within the nerve trunk might also be mentioned.

Dr. John H. W. Rhein referred to arterial changes as related to the nervous system, and said that the hemorrhagic disturbances constitute but one symptom, which is seen in arterial change within the brain. There is mental sluggishness, trembling and atrophy of the muscles. He spoke of attacks which quite frequently result from changes in the central arteries. The face is flushed, the patient often falls to the ground but never loses consciousness. These attacks are due to anemia of the brain, as Dr. Goepp has suggested.

Dr. Peter said that spasm of the central artery of the retina, or its branches, when present is one of the earliest manifestations of the disease. It is also frequently observed after the arteriosclerotic process is well under way. He has observed it in three cases—20, 22, and 26 years of age—as an isolated symptom. In each instance there was a systolic blood pressure of 170 mm.

Several years ago he had the opportunity of studying several hundred cases and incorporated them in a paper, including for purposes of comparison nine cases of syphilitic neuroretinitis and three cases of parenchymatous nephritis. The average blood pressure in the various conditions was as follows:

9 cases of syphilitic neuroretinitis.....	132 mm.
3 cases of parenchymatous nephritis without ocular manifestations	132 mm.
26 cases of retinitis, arteriosclerotic in origin..	165 mm.

49 cases of neuroretinitis due to same cause..	185 mm.
6 cases of hemorrhagic retinitis due to same cause	205 mm.
3 cases of so-called albuminuric retinitis.....	190 mm.
3 cases of nephritic papillitis.....	225 mm.

When taken collectively, this study in so far as it goes shows a more or less definite relation between the high blood pressure and the severity of the ocular manifestations.

Dr. Reber called attention to the fact that the walls of the retinal vessels are of the same index of refraction as the retinal structure itself, and that because of these things we become conscious of the walls of the vessels only when they are diseased. In studying vascular changes in the retina, it is not sufficient to simply inspect the optic nerve head and then swing the light axis out into the macula. The retinal crossings which display the more marked characteristics of angiosclerosis are generally located anywhere from one and one-half to two disc diameters away from the edge of the disc. It therefore requires considerable search and study to recognize such changes correctly. The five signs laid down by Alleman some years ago are good today; namely, the brick red hue of the nerve itself; the twisted little macular vessels; the broadened light streak producing the so-called silver wire artery; the varying contour of the veins, and particularly their alteration in caliber and course where crossed by the arteries. These are the signs that should be particularly looked for, as they are most likely to occur with the prepressure of the prenephritic stage. In the presence of established vascular change we cannot accomplish much. The great need now is for correlated study of these earliest signs and the coexistent general blood pressure. Naturally patients with such changes in their intraocular vessels are asthenopic, as Dr. Ziegler has pointed out. The ciliary body is made up of muscular fiber and blood vessels, and even slight sclerosis of the blood vessels of the ciliary body will theoretically at least reduce the power of accommodation.

Dr. Goepf said he was impressed with the precision with which the ophthalmologist could make his examination. The interesting question is, which is prior, the changes in the retinal vessels or our own observation of the blood pressure?

Dr. Harbridge drew attention to the experiments upon rab-

bits which were hung up by the hind legs for varying periods of time. Angiosclerotic changes were noted that seemed to bear direct relation in their development to the time and length of suspension. He also referred to his own classic case of spasm of the retinal vessels, occurring while under ophthalmic examination.

D. FORREST HARBRIDGE,

Secretary.

WILLS HOSPITAL OPHTHALMIC SOCIETY.

Meeting of February 5, 1912. Dr. S. Lewis Ziegler, Chairman.

Nonoperative Treatment of Pterygium.

Dr. J. Norman Risley in a preliminary clinical report advocated a conservative treatment of pterygia which had proved most beneficial in all cases thus far in which he had applied it. In all there was not only a distinct relief from the distressing symptoms, but a decided decrease in the vascularity and a gradual lessening of the area occupied by the pterygium.

The method used was a thorough massage of the entire area occupied by the pterygium with a cotton applicator saturated with a 10 per cent alcohol solution, having previously produced a thorough anesthetization with a 2 per cent cocain solution. The treatment was continued on alternate days.

A Case of Probable Orbital Periostitis From Frontal Sinusitis.

Dr. Posey showed a case of circumscribed orbital edema from frontal sinusitis. The patient came on account of moderate proptosis and a swelling of the lids of the left eye. Examination showed a mass underneath the supraorbital rim, which was more especially pronounced to the temporal side. The swelling was firm, smooth and apparently external to the periosteum. The eyeground was normal, save for a dilatation of the retinal veins. There was a history of nasal trouble of ten years' standing, and a rhinologic examination by Dr. G. B. Wood showed acute inflammation of the frontal and ethmoidal cells. Treatment of the sinuses relieved the orbital condition in some measure.

An exploratory puncture revealing pus under the periosteum, an incision was made, without, however, giving exit to more purulent matter. Dr. Posey was of the opinion that the circumscribed swelling of the orbit was an instance of sinus infection being followed by orbital infiltration, which was probably in the nature of a collateral inflammatory edema.

A Shrunken Globe Enveloping an Unusually Large Fragment of Steel.

Dr. Posey exhibited a shrunken globe, which contained a piece of steel 28 mm. long, 16 mm. in height, and weighed 142 grains. The injury had occurred five years previously, and although sight had been obliterated and the greater part of the eyeball destroyed, the inflammatory symptoms had subsided without treatment, and the phthisical stump had carried the foreign body with but slight signs of irritation.

Dr. Sweet stated that he had recently examined a man, 65 years old, with failure of vision in the right eye, the result of retinochoroiditis. The left eye was injured over forty years ago, and now was a shrunken tender stump, with total corneal degeneration. An X-ray examination showed a piece of steel 3x2 mm. in the interior of the shrunken globe, but the man would not consent to enucleation.

Lime Burn of the Eye.

Dr. W. W. Watson (by invitation) read a paper and related the history of a case recently seen by him. The patient applied at the Howard Hospital in December, 1911, with a lime burn of the left eye, involving both cul-de-sacs. The severity of the burn was marked in the first forty-eight hours, but by rigid applications of hot compresses, atropin, boric acid wash and iodoform ointment, and daily separation of the lids from the globe, deep ulceration was avoided, and in three weeks the patient was discharged from the hospital with entire absence of symblepharon and only a slight haziness of the cornea.

The severity of the conjunctival involvement depends on the amount of lime imbedded, its early removal and neutralization. Adhesions of the lids and globe are prevented by frequent manipulations of the former, by irrigation of the sac with permanganate solution, by introducing a mixture of carbolic acid and olive oil or iodoform ointment, and by the separation of the surfaces with eggskin, as suggested by Coover and Black.

Deep ulcers of the cornea may give rise to staphyloma, corneal fistula, iris adherens, or panophthalmitis. The opacities of the cornea were thought by Dr. Watson to be due to an

irregular infiltration of the substantia propria with the lime salts, and not to scar tissue. Though showing little tendency to clear up, these opacities may be somewhat relieved by the application of a 10 per cent solution of neutral ammonium bitartrate, especially if this be applied early.

Dr. Zentmayer said, regarding the prognosis, that Dr. Watson stated that with the separation of the slough the ulcer went on to cicatrization. This was not always the case, as frequently there was a deep burn of the sclera adjacent to the corneal lesion which so delays reparation of the corneal tissue that perforation takes place. He had years ago been led into giving a favorable prognosis because of the cleansing of the burned surface, in which perforation subsequently occurred; and once in consultation had been obliged to revise the prognosis given by the surgeon in charge, because of oversight of this danger.

Dr. Posey said that he had followed the case reported by Dr. Watson with much interest, and had been surprised that no adhesions had occurred between the lid and the globe. He attributed this to an early fatty degeneration which had occurred in the epithelial cells of the bulbar conjunctiva. He did not believe it was possible to prevent symblepharon by the interposition of a protective material between the lid and the globe. He agreed with Dr. Zentmayer that the prognosis in this class of cases should always be most guarded, and desired particularly to caution against giving an opinion by the appearance of the eye during the first forty-eight hours following the burn, as in most cases violent reaction did not set in until later.

Dr. Chance said that he would not minimize the importance of our efforts to prevent the disastrous effects of lime burns of the cornea, yet he desired to emphasize the necessity of preventing the adhesion of the lids to the eyeball whenever possible. Such adhesions not only interfere with the movements of the globe, but are painful; and operative measures resorted to later are seldom successful by reason of the absorption of the loose subconjunctival tissues and the consequent contraction of the tarsobulbar sac. It is his custom to personally attend to the dressing of lime burns and to separate the lids from the globe as widely as possible, and to instruct the patient to rotate the globe. At each dressing he gently

but firmly massages the cul-de-sac with ointments on a cotton carrier. It is his belief that numerous cases have been benefited by this procedure and that impending adhesion has been prevented. In certain instances he has used thin lead plates conforming to the conjunctival sac, but he is prejudiced against them, as he believes they act as irritating foreign masses and excite rather than arrest exudation, whereby the resultant contraction is greater than one can afford.

The Davis Operation in a Case of Double Ectropion.

Dr. Ziegler presented a case of marked double ectropion, the result of a nitric acid burn. He had performed on the right eye a Davis plastic at the external canthus of each lid, and an extensive Hotz-Thiersch transplantation on the upper lid of the same eye. He found that Ziegler's galvanocautery puncture of the mucous surface of the lids of the other eye was sufficient to restore them to their normal position. Rapid dilatation of both tear ducts was also necessary for the relief of an annoying epiphora.

A Case of Probable Malignant Disease of the Lacrimal Duct.

Dr. Wm. G. Schlindwein, Erie, Pennsylvania (by invitation), exhibited a case of probable malignant disease of the lacrimal duct. The case had been under treatment for several months without apparent effect.

Dr. Ziegler suggested that an attempt be made to destroy the growth by either the galvanocautery needle, fulguration, or Ewing's solution, and if these failed, a radical operation.

Dr. Posey said that the clinical appearance led him to think that the swelling was probably epitheliomatous in origin, and he believed that the ethmoidal and anterior ethmoidal cells, together with the floor of the orbit, were in all likelihood greatly involved. He referred to thoradin and said that its use had been highly lauded in just such cases. He had had no experience with it, however, and would advise the complete extirpation of the growth by operation. He thought that the prognosis for vision in the left eye should be guarded, as he deemed it not unlikely that it would not be long before the sight in that eye would be lost in consequence of orbital involvement.

A Case of Retinitis Proliferans.

Dr. Zentmayer reported a case of retinitis proliferans in an Italian man, 22 years of age. Two years previously he had been under the care of Dr. Posey with bilateral neuroretinitis with hemorrhages. At that time the vision of the left eye was the poorer. On leaving the hospital vision was very much improved in each eye. Sight had again been failing for about two months, and was now: O. D., L. P.; and O. S., 6/20. No fundus reflex can be obtained from the right eye because of the dense vitreous opacities, probably hemorrhages. In the left eye the proliferation was for the most part within the retina in the form of broad white lines, but in places the endothelial cells had penetrated into the vitreous, and there are forming vitreous sheets with new vessels.

A Case of Sympathetic Neuritis.

Dr. Zentmayer showed a case of sympathetic neuritis. A man, 40 years of age, received a clean cut wound entirely within the cornea, with a localized lenticular opacity, the result of an exploding electric lamp thrown at his feet on Halloween. No foreign body was within the eye. The patient was discharged from the hospital at the end of two weeks with a small anterior synechia and a quiet eye. One week later there was a pronounced neuritis in the fellow eye. Vision in this eye was almost normal, and the visual field was but slightly contracted. The offending eye was immediately enucleated. Mercurial inunctions and salicylate of soda, after the method of Gifford, were at once begun and have since been carried out. There is still considerable swelling of the papilla. Vision is normal.

Aspergillus Ulcer of the Cornea.

A case of aspergillus of the cornea was shown by Dr. Zentmayer. There was a round, yellowish, superficial ulcer with a black central spot, and a second deeper infiltration adjacent to it. Cultures were made by the assistant pathologist to the hospital, Dr. Brinkerhoff. The surface of the culture was covered by a woolly whitish mould which under the microscope proved to be the aspergillus flavus.

Meeting of March 5, 1912. Dr. William Zentmayer, Chairman.

Microphthalmos.

Dr. J. Norman Risley presented for study a case of microphthalmos in a child five months of age. It was impossible to demonstrate the presence of light perception in either eye. The right eye was about the size of a shoe button, while the left was apparently of normal size. The mother attributed the deformity to the accidental pushing back of the right eye into the orbit by the attending physician during delivery, which, while not instrumental, was very prolonged and difficult, with the expectation of a stillborn child.

The ophthalmoscopic study of the left eye was very unsatisfactory through a pupil that dilated only slightly under atropin, and no view of the disc was obtainable, but there were extensive atrophic areas throughout the fundus.

The child was the fourteenth of apparently healthy, sober and industrious parents. All the children had been born at term, one living only about one and a half hours, and one still-born after the mother had received a severe mental shock when she was expecting labor.

It was during her sixth pregnancy that she received the erroneous report that her husband had been killed. She went into a state of unconsciousness lasting two weeks, during which time the child was born dead. Upon regaining consciousness she was completely deaf and blind. The hearing was restored in about a month and vision returned in the left eye in about a year, but at this time there is no light perception in the right eye and no fundus changes can be seen to account for it. It is of course not likely that there is any connection between this and the condition of the child presented for study today, as there have been seven healthy children born since.

Dr. Posey suggested that the condition in both eyes might be explained by an involvement of the mesoblastic tissue during fetal life, in consequence of syphilis in the mother. He referred at some length to microphthalmos and its causes, and spoke of a case recently observed by him where microphthalmos in one eye was associated with a cyst, while a coloboma of the iris and choroid was present in the other eye.

Dr. S. D. Risley said that in consideration of the mother's history of blindness from shock, complete and permanent in

the right eye and partial in the left, it was difficult to disassociate in one's mind the occurrence of the ocular conditions in the child, from the notions at one time so generally entertained regarding maternal impressions. Remarking that everyone present had doubtless seen many interesting occurrences in this connection, he recalled a striking example occurring in his own early experience, where a child had been born with a forearm severed by the encircling cord at the exact place where the father's arm had been amputated for a gunshot wound during the Civil War. The distal remains of the atrophied forearm was still adherent to the stump. The suggestion of Dr. Posey that the choroidal atrophy in the blind eye of the child was possibly due to intrauterine syphilis, he thought should be considered as a possible etiologic factor, but it did not seem probable, since the mother's health seemed perfect and she had been the mother of fourteen children, all healthy, perfect children, except for the ocular defect in the child brought before us for study.

Dr. Burton Chance remarked that the subject of "maternal impressions" on anatomic structures is a most fascinating one; he believed, however, that those connected with formation of the eye are merely coincidental rather than direct. The stages of the development of the optic vesicle are accurately known and their time precisely accounted for. Undoubtedly, most of the malformations are of inflammatory origin and have not been caused by psychic or inherited forces producing disturbances of the embryologic elements. In direct support of Dr. Risley's and Dr. Posey's suggestion that toxic influences have had a decided influence in the case of this child, it is interesting to recall Pagenstecher's findings in a series of experiments he made upon pregnant rabbits to which he fed naphthalin. Not only did he find cataracts in the offspring, but also malformations of the lids and globes; and these malformations could be influenced by timing the administration to coincide with the period at which the embryologic differentiation occurred. He was able to bring about adhesion of the conjunctiva to the cornea; to interfere with the development of the lids; microphthalmos and even anophthalmos. He proved that intoxication was necessary, because in later pregnancies when naphthalin was not given, the progeny were healthy and well formed.

Dr. Harbridge referred to a case of unilateral microphthalmos in which there was no history of previous injury or shock to the mother. The delivery was noninstrumental. Vision, fingers at two feet. Along the lower border of the cornea there was a curvilinear scar. There was slight ciliary injection and in the fundus bands of connective tissue formation were observed.

Regarding the question of so-called "maternal impressions," Dr. Harbridge stated that while many cases may be quite misleading from a superficial point of view a recent experience forced him to belief that all may be accounted for by pure coincidence. At the suggestion of a physician he was requested to examine a colored child a few weeks ago who was reported to have been born without eyes. Eight months previous to the birth of the child Dr. Harbridge had performed a Mule's operation upon the mother.

An examination of the child revealed an apparent absence of both globes, although the lids, orbits, etc., were full formed. Feeling confident that at last a genuine case of "maternal impression" had been discovered, Dr. Harbridge began to confer with medical friends regarding the subject. Adverse criticism suggested a reexamination and a more careful inquiry into the history. During confinement the mother had been attended by another woman, no physician being present. A few days later a free discharge from the eyes was established, and upon one occasion while the eyes were being washed an unusual jelly like secretion was wiped away. A more thorough examination revealed two small, shrunken, pea sized, cyst like remains of what undoubtedly were at one time the globes. The condition was the end product of a case of neglected ophthalmia. Despite this explanation the parents and friends believe the child to be marked.

Leucosarcoma of the Choroid.

Dr. S. D. Risley presented for study the microscopic mounting and microscopic slides from a case of leucosarcoma with the laboratory report. The man, aged 50, had been assigned to his service in February with a totally blind eye. Failing vision had first been noticed in August, 1911, and had steadily advanced to complete blindness. There had been no pain or notable inflammatory reaction at any time, nor had there been

any history of ocular disease or discomfort. The eye was white, tension normal, and the pupil reacted. After dilatation a grayish yellow nodular mass with blood vessels coursing over its surface and filling the greater part of the ball, was seen. The mass came well forward into the ciliary region on the nasal side and could be readily studied with oblique light or the ophthalmoscopic mirror. The absence of any history of ocular inflammation seemed sufficient to exclude the diagnosis of disease of the pseudogliomatous type; while the patient's age and somewhat rapid development of the growth pointed to its probable malignant character. The removal of the globe was therefore advised. The laboratory study by Dr. Nelson M. Brinkerhoff which is appended has confirmed the diagnosis.

Pathologic Report.—On macroscopic examination the external appearance was normal. The anterior chamber was of normal depth and was filled with a brownish yellow exudate. The iris and ciliary bodies were somewhat thickened. The lens showed cataractous changes. The main body of the growth occupied almost the center of the vitreous chamber, and appeared to spring from the superior nasal region. It was mushroom in shape, the base being smaller than the apex. On the anterior surface there had been a free hemorrhage apparently of recent occurrence. The choroid in the region of the growth was very much atrophied and appeared to be separated from the main body by a lighter translucent film, about 1 mm. in breadth. The retina was detached, edematous and adherent to the growth. Beneath it was a homogeneous, gelatinous exudate, which extended a few mm. beyond the advancing surface of the growth. The nerve showed no pathologic changes. On microscopic examination the growth proved to be a small, round cell leucosarcoma.

On account of the danger of metastasis to the liver, Dr. Posey deemed it wise to remove all eyes suspected of containing sarcoma in which the vision had been abolished and in which there was a large mass in the vitreous, even though tension was not elevated. While transillumination was of value, the reflection of the rays of light might be blocked by a mass of lymph or blood, as well as by a neoplasm, and the operator must at times advise enucleation when the precise nature of the case was in doubt.

Foreign Body in Vitreous Chamber.

Dr. S. D. Risley presented a patient sent by Dr. Ross of Altoona, with a metal fragment in the vitreous chamber of the right eye. The body had penetrated the ball through the inner half of the right upper eyelid on Friday, March 1st. The man reached the hospital on the following Monday morning with V. = 6/12. Localization by Dr. Sweet showed the foreign body 20 mm. back of the corneal pole, 6 mm. to the nasal side of the vertical meridian, and 8 mm. below the horizontal plane. The electric ophthalmoscope exhibited a gray line through the vitreous from near the point of entrance of the foreign body to a point near its localization where it was lost in a gray opaque vitreous. The bulbar conjunctiva and episcleral tissue below and to the nasal side were markedly chemotic. A conjunctival flap was raised at the lower, nasal quadrant of the globe, a scleral puncture made and the foreign body extracted with the magnet. It proved to be a rusty, friable scale of metal 6 mm. long, 4 mm. wide and 1 mm. thick. The patient was placed in bed under the usual treatment. Within twenty-four hours a violent panophthalmitis developed, with orbital cellulitis and profound general infection. Temperature $102\ 4.5^{\circ}$, rapid pulse, dusky, flushed skin; swollen and painful submaxillary and cervical glands, and a distressing cough and congestion of the lungs which, however, did not pass into pneumonia. Dr. Risley had never witnessed so violent an attack of orbital cellulitis or such rapid destruction of an eye from any form of panophthalmitis. The ball was freely incised and free incisions were made into the orbital tissues, but without any free discharge of pus. Laboratory study of the discharge showed the Friedländer bacillus and numerous streptococci and staphylococci. For two or three days the man's life was in serious peril, but at the time of the report seemed on the road to recovery. Dr. Risley presented the case for study not only as an unusual example of rapid destruction of an organ by local mixed infection, but because it awakened the inquiry as to whether the general infection was already present at the time the injury was received and the local conditions secondary, or did the general disorder result through absorption from the local infection. The man had suffered a severe attack of pleuropneumonia a few years before, from which he had made a lingering recovery. At the time he received the eye injury he

was under his physician's care for some general ill health, which he describes as backache, poor appetite and a general malaise, and states that his physician had asked for a specimen of urine for examination, but the accident intervened and prevented any further study.

Dr. Posey said that he thought it not unlikely that the orbital cellulitis in Dr. Risley's case was occasioned by endogenous infection in consequence of some blood condition of the patient which doubtless existed before the accident. To demonstrate this association, he presented a boy with many of the signs of tuberculosis of the ciliary body, in whom the manifestation of ocular disease followed a blow upon the eye from a door. Dr. Posey recalled how often abscess of the orbit was observed in tubercular subjects even after slight trauma when the integument was unbroken, and referred to a recent paper in which Mora had recorded a number of instances in which orbital symptoms were set up in nontubercular subjects by the action of staphylococci acting endogenously upon the site of the contusion.

Tuberculosis of the Ciliary Body.

Dr. Posey presented a case of probable tuberculosis of the ciliary body in a boy, following a slight blow upon the eye. When first seen, several days after the accident, the lids were slightly swollen but not discolored, but the eyeball was much injected. The outer half of the anterior chamber was filled with what seemed to be a turbid aqueous, though the humor in the inner half of the chamber was clear. Descemet's membrane appeared crumpled over the area corresponding to the turbid aqueous. The iris immediately posterior to the affected tissue was vascular and decidedly raised above the plane of the rest of the membrane. Filling the pupil and apparently responsible for the localized turbidity of the aqueous, a thin layer of whitish lymph was seen, which apparently issued from the ciliary body at a point corresponding to the raised and vascular area in the iris. Von Pirquet reaction negative. Wassermann reaction not tried.

Bilateral Dislocation of the Lens.

Dr. P. N. K. Schwenk presented a case of bilateral dislocation of the lens in a man 46 years of age, where the lens had dropped into the anterior chamber and later had fallen back

into the posterior chamber. He had requested the senior house surgeon to instill one drop of homatropin to dilate the pupil, and have the patient lie on his face, when by gravity the lens might drop forward into the anterior chamber again, and if this occurred to instill eserine and hold it there until it could be removed. Four hours after the instillation of the homatropin the patient had the symptoms of acute glaucoma. The next day the patient was etherized and as much of the lens looped out as could be seen, followed by an attempted iridectomy. Several days following the operation the lens cortex in the capsule was seen suspended from above, the capsule having become incarcerated in the wound. In two weeks all the lens had become absorbed and only a few shreds of lens capsule were visible. Today the eye is quiet and the iris is nearly normal below but drawn up above. The vision of the other eye is 6/9. A sister of the patient was operated on by Dr. Schwenk four years ago, when he removed the dislocated lens from her right eye, with a resulting vision of 6/12. The left eye was enucleated because of glaucoma following the use of drops.

This is the third case that has come under his observation, and Dr. Schwenk deemed it of sufficient interest to present to the society. Does the lens serve as a factor in producing glaucoma? It is evident from these cases that the loose lens acts as an irritant and as a foreign body only, and its swelling is not the exciting factor; but glaucoma follows dilatation of the pupil when the lens is dislocated, and we should avoid the use of mydriatics in such cases.

Dr. Chance was inclined to regard the rise of tension in Dr. Schwenk's case as having been caused by the effects of ciliary irritation. The dislocation of the lens from the region of the zonula had not of itself given rise to the glaucomatous symptoms, but, on the contrary, the inflammation of the ciliary region had disturbed the osmosis of the intraocular fluids and had brought about the increase of tension through the retention of fluids of excessive density.

Congenital Symblepharon.

Dr. Zentmayer presented a patient with congenital symblepharon and other malformations. N. G., age 7½ years, was a full term baby. Before an operation performed five

years ago a translucent skin covered the entire cornea when the eye was directed forward, and one-half of the cornea when the eye was turned in. The father thinks the eyeball increased in size after birth.

P. C., slight epicanthus. There is a redundancy of conjunctiva which is adherent to the cornea over the lower outer third and extends as a broad band to the outer canthus. The canthus is broad and blunt, the conjunctiva merging with the skin of the temple. There is a strong convergent squint. When the eye is abducted the conjunctiva is thrown into a second fold which covers the cornea at its upper outer third. There is a moderate grade microphthalmos. The pupil is slit like and displaced upwards. Vision equals counting fingers at one meter. The other eye is normal. There are scars where supernumerary tragi and thumbs have been removed. There is a malformation of the mouth similar to that of the palpebral fissures. The redundant conjunctiva was dissected off from the cornea, a deep cul-de-sac was made, the incision being carried down to the lower orbital margin, the raw edge of the conjunctiva was then attached to the periosteum of the lower orbital margin as in Week's operation for contracted socket. A tarsorrhaphy and a free tenotomy of the internal rectus was performed.

Dr. Chance said the adhesion of the lid to the globe in Dr. Zentmayer's case was like a case of congenital symblepharon he had under his care several years ago in a woman with cataracts, whose daughter also had congenital cataracts; and he was of the opinion that a toxic influence had been at work here, so that Dr. J. Norman Risley's case might well be linked with Dr. Zentmayer's for the purpose of study.

Meeting of April 1, 1912. Dr. S. Lewis Ziegler, Chairman.

Extract of the Suprarenal Gland in the Treatment of Acute Corneal Staphyloma.

Dr. Paul J. Pontius read a paper on "Extract of the Suprarenal Gland in the Treatment of Acute Staphyloma of the Cornea," and related six cases successfully treated by the agent. Dr. Sajous, the eminent authority on the physiologic action of the glandular extracts, was quoted as saying that the influence of the extract of the suprarenal gland is explained by

the great rise of metabolic activity it engenders directly in the muscular elements of the arterioles that supply the cornea and sclera. The caliber of the arterioles is reduced by contraction of their muscular coat, and the volume of blood plasma admitted to the ocular structures is greatly reduced. The veins which carry off the blood from these structures are not influenced, however, and the intraocular tension is relieved merely because more fluid leaves the eye than is supplied by the arterioles. On account of this physiologic action Dr. Pontius was induced to use it in acute staphyloma of the cornea, so often seen following ulcerative keratitis, instilling a 1-1000 solution three times daily, with very gratifying results. He concluded that the extract of the suprarenal gland has no specific action on the corneal tissue, but it reduces acute staphyloma of the cornea by lowering intraocular tension through a constriction of the arterioles and the relief of pressure in the lymph channels.

Dr. Ziegler thought the use of adrenalin as suggested by Dr. Pontius marked an important addition to our therapeutic armamentarium. He detailed several cases in which he had used this treatment with very marked success. He had in addition to the adrenalin used a ii-iv gr.-oz. alum solution. The staphyloma had not only greatly improved but the cornea had cleared to a marked extent.

Dr. Risley had seen a number of patients with perforating ulcers of the cornea during the past year who had been greatly benefited by the frequent instillation of a solution of adrenalin chlorid 1-5000, after the more usual methods of treatment had proved unavailing.

Traumatic Cataract—Copper Scales in the Vitreous Chamber.

Dr. Samuel D. Risley presented for study a young man who, as the result of the explosion of a box of dynamite caps, had lost the right eye and had traumatic cataract with a firm adhesion of the iris to the cornea at the lower nasal limbus. An X-ray study by Dr. Sweet had shown two metallic fragments, presumably copper, situated on or near the posterior capsule of the lens. The inability of the patient to fix his gaze upon any point made the problem of localization difficult and uncertain. Dr. Risley presented the case as a text for remarks upon the danger from the presence in the vitreous

chamber of metals like copper, zinc, brass or lead because of the rapid chemical changes which occurred and the irritating quality of the resulting metallic salts.

Dr. Risley presented also for study a large group of patients with mature, incipient and immature cataract of one or both eyes, all of which had posterior polar opacities, floating vitreous webs and choroiditis. Two of the group were workers in molten metals in industrial establishments, while the other cases were all victims of cardiovascular disease, with high blood pressure, albuminuria, diabetes or rheumatism. He pointed out the need for more or less prolonged general treatment for both the local and general conditions before any operative procedure could be wisely undertaken.

Dr. S. Lewis Ziegler showed a case illustrating Dr. Risley's remarks concerning metallic bodies in the vitreous chamber. He spoke of two cases in which he had removed copper particles from the vitreous with forceps.

The Zeiss-Teleater Loupe.

Dr. Ziegler exhibited the Zeiss-Teleater loupe. This is the ordinary theater prism glass of 3X to which has been attached a loupe which forms a practical corneal microscope. The combination gives a flat field and can be focused so that the observer can stand one foot from the patient.

Tubercle of the Choroid Healed by Tuberculin.

Dr. William Campbell Posey related the history of a patient who had applied for treatment because of an inflammatory condition of the right eye of four weeks' standing. Examination revealed in addition to all the signs of an acute uveitis, a distinct bulging in the sclera about the size of a small pea, located about 5 mm. posterior to the limbus, at a point midway between the inferior and internal rectus muscles. Vision equaled fingers at 1 meter. Judging the swelling in the ciliary region to be either tuberculous or gummatous, the patient was admitted to the hospital and a positive reaction obtained after the internal administration of tuberculin. Following the therapeutic use of tuberculin and the usual local treatment for uveitis, there was a rapid subsidence of the local symptoms, so that the patient was able to leave the hospital at the end of three months with a vision of 6/30. By this time the media had

cleared sufficiently to disclose the presence of a large, white, rounded mass just posterior to the lens in the inner lower part of the anterior segment of the globe. The patient is now being treated as an outpatient, and though the vitreous is still somewhat hazy, uncorrected vision equals 6/35.

Dr. Ziegler said that the internists do not have the degree of confidence in the therapeutic use of tuberculin as do the ophthalmologists. He had treated at least thirty cases with tuberculin during the past five years, and not only was there a complete cure in every case, but in only one was there any recurrence. Dr. Ziegler considered it the only proper form of treatment in these cases.

Exophthalmos from Adenoids.

Dr. Posey exhibited a child with a mild degree of exophthalmos in both eyes, which doubtless was occasioned by shallow orbits, in whom the prominence of the globes had been greatly increased by the presence of adenoids, the proptosis recovering to its normal degree after the removal of the growths at the Children's Hospital. Dr. Posey said that while this was the first case of the kind which he had seen, the literature contained many such, and cited cases reported by Holz, Spittler, and Hack. He also referred to a case reported by Batten, where the orbital involvement appeared after an attack of tonsilitis. Dr. Posey also pointed out the connection which existed in a number of cases in the literature with Graves' disease, and referred in particular to a girl of 17 years reported by Hack, in whom the exophthalmos had existed since early childhood. Examination revealed a marked hyperplasia of the erectile tissue of the middle and lower turbinates. The lower turbinates were cauterized and the following day the exophthalmos had nearly disappeared. The Daltymple sign and the Graefe sign which had been present disappeared. Also the nervous cardiac palpitation, and the size of the thyroid diminished; and a slight myopia, which had been present before the nasal operation, disappeared.

The exophthalmos had preceded all the other signs of Graves' disease for some years, and Hack thought that the excitation of certain portions of the peripheral sympathetic by the swollen tissues of the nose had occasioned the other symptoms, all being, according to him, of the nature of a re-

flex neurosis. He attributed the exophthalmos to hyperemia of the orbital vessels, caused by reflex dilation of their walls and to a marked turgescence of the retrobulbar fat, which he said Michel had already referred to as cavernous tissue.

Exophthalmos from Mucocoele of the Frontal Sinus.

Dr. Posey exhibited a woman with a mucocoele of the frontal sinus, which had occasioned displacement of the left globe and which he had drained with but little resultant deformity by Arnold Knapp's method. The patient, a woman of 52 years of age, had suffered no inconvenience from the encroachment of the frontal cells upon the orbit other than muscular asthenopia. The globe was unaffected, save for a faint haze in the anterior portion of the vitreous. Corrected vision was normal. The contents of the cells were excavated through an incision in the upper angle of the orbit, care being taken to avoid injury to the pulley of the superior oblique muscle. With the assistance of Dr. G. B. Wood, rhinologist to the Howard Hospital, a free opening was made into the floor of the frontal cells, and thorough drainage into the nose by the insertion of a rubber drainage tube of fair sized caliber through the ethmoidal cells. Dr. Posey laid stress upon the closure of the orbital wound at the time of the operation and the maintenance of a large hole for drainage through the roof of the nose.

Dr. Risley noted with pleasure Dr. Posey's commendation of opening the frontal sinus and ethmoid cells under the orbital ridge at the nasal angle of the orbit. He had claimed for this method many years ago that it caused less deformity from the resulting scar and gave more ready access to the nostril by way of the anterior ethmoidal cells for purpose of drainage. He thought that mucocoele of the frontal sinus not infrequently simulated malignant disease of the orbit, and recalled a case in his service at the Wills Hospital in which several of his colleagues were of the opinion that the extreme exophthalmos was due to a malignant growth in the orbit and advised exenteration. Fortunately before enucleating the eye, which had V. = 6/12, he made an explorative incision under the upper eyelid and found the exophthalmos due to the accumulation of an enormous quantity of mucopurulent material behind the ball, which had escaped through the necrotic floor of the frontal sinus.

Congenital Dislocation of the Lens.

Dr. Posey exhibited a child from whom he had removed a dislocated lens from the vitreous a week previously. Both lenses had been subluxated congenitally, but had dropped back into the vitreous after an attempt at needling by a colleague. Referring to the ease with which the lens had come away with the first gush of vitreous, Dr. Posey said that the elder Knapp had years ago maintained that he had never failed to remove a dislocated lens from the vitreous in such cases by simple compression of the lower half of the globe by the fingers through the approximated lids.

Rodent Ulcer of the Orbit.

A case of rodent ulcer of the orbit which had invaded the frontal and ethmoidal cells, was exhibited by Dr. Posey, who said that it was his intention to eradicate the disease as far as possible with the knife, as he had but little confidence in the employment of the X-ray or cauterizing agents in the treatment of this class of cases.

J. MILTON GRISCOM,
Secretary.

BOOK REVIEWS.

Handbook to Medical Europe.

By JAMES HENRY HONAN, M. D. Published by P. Blakiston's Sons & Co. Philadelphia, 1912. Price, \$1.50.

This book contains in its 261 pages much valuable information concerning the schools and clinics of Europe, with names of the professors and heads of the clinic, and a statement of the courses given and the charges for each. It also contains maps of Berlin, Edinburgh, London and Paris. Anyone intending to pursue his studies at one of the European universities will do well to acquaint himself first with the text of this book, as he will save himself much time and be able to outline his work before he starts.

C. L.

A Treatise on Diseases of the Eye.

By JOHN E. WEEKS, M. D., Professor of Ophthalmology in the University and Bellevue Hospital Medical College, New York. In one octavo volume of 944 pages, with 528 illustrations and 25 full-page plates. Cloth, \$6.00, net. Lea & Febiger, Publishers, Philadelphia and New York, 1910.

This is a quite complete and up to date text book on ophthalmology. Not only are the more common affections described in detail, but the very rare lesions are also noted. Valuable points in connection with the book are the chapters on special remedies, microscopic technic, and the extensive bibliography.

C. L.

Surgery of Deformities of the Face, Including Cleft Palate.

By JOHN B. ROBERTS, A. M., M. D., Professor of Surgery in the Philadelphia Polyclinic. Published by William Wood & Co., New York. Price, \$3.00.

This work gives in the small compass of 259 pages a description of plastic operations on the face which otherwise must be sought through various text books and journals. However, the portion dealing with the eye, at least, is lacking in the details which are necessary for the beginner. The illustrations are numerous and good.

C. L.

The Technic of Microscopic Examination of the Eye.

Die mikroskopischen Untersuchungsmethoden des Auges. By Dr. S. SELIGMANN, Hamburg. Published by S. Karger, Karst. 15, Berlin, 1911.

This is an enlarged and revised edition of the book published in 1898. Some of the new subjects discussed are staining of living tissue, fat staining, dry celloidin method, etc. The book should be in the possession of anyone who does microscopic work on the eye.

C. L.



THE ANNALS OF OPHTHALMOLOGY

Vol. XXI

OCTOBER, 1912

No. 4

XXII.

SERUM AND VACCINE THERAPY IN CONNECTION
WITH DISEASES OF THE EYE.

STEPHEN MAYOU, M. D.,

SURGEON AND PATHOLOGIST, CENTRAL LONDON OPHTHALMIC
HOSPITAL; OPHTHALMIC SURGEON TO BOLLINGBROKE
AND PADDINGTON GREEN CHILDREN'S HOSPITAL,

LONDON.

The work on which this essay is based is the outcome of experience gained as pathologist to an ophthalmic hospital for six years, during the whole of which time treatment has been carried out by means of vaccines and sera. The great impetus which has been given to vaccine treatment by Wright has been carefully followed from the beginning. His discovery of opsonins and the method of controlling the dose of vaccine by the opsonic index was used during the first two years, until I found that the reaction of the eye, except under special conditions, gave an accurate indication of the doses required. Following this a large number of cases have been treated in the hospital by vaccines prepared in the laboratory, but the cases which are quoted in this essay are only those which have been under my direct care and upon which I have made personal observation.

The main original investigations which have been carried out are in connection with tubercular and staphylococcal in-

fections and their treatment by vaccines, which have already proved so successful in the treatment of foci of diseases elsewhere in the body.

The first recorded attempt at immunization by the use of vaccines dates from 63 B. C., when Mithridates, the Pontine king, experimented on prisoners and himself with doses of snake poison. It is reported that after his defeat by Pompey he failed to kill himself with snake poisons, owing to the high degree of resistance he had obtained by their continual use. He further showed the therapeutic use of the blood from animals fed on poison. Other instances of such immunity are well known, such as the professional snake charmer's immunity to snake venom and the beekeeper's immunity to bee stings.

In more modern times immunity for certain diseases was practiced by vaccination of the patient with the attenuated virus. This was first performed for smallpox, and was introduced into England by Lady Montague in 1721. As the results were uncertain it fell somewhat out of use until in 1798, when Jenner found that by inoculation of cowpox—an attenuated form of smallpox in cows—protective immunity could be produced against the disease. In more modern times the work of Pasteur stands preeminent. In 1880, Pasteur showed that fowls could be immunized against hen cholera by inoculating them with an attenuated broth culture of the hen cholera bacillus. Slight illness was the result, followed by a permanent immunity. Anthrax in sheep was similarly treated prophylactically. The prophylactic treatment of rabies in man was carried out in much the same manner, except that instead of the actual organism being used, the virus contained in the tissues of the animal affected with disease was attenuated by drying and used for inoculation. In 1887, Salmon, Smith and Roux showed that the organisms killed by heat could be used for producing immunity, and Roux and Chamberland in the same year showed that immunity in some instances could be produced by using the toxins alone. In 1900, Landmann showed that the aqueous extract of the tubercle bacillus could be used in producing immunity against tuberculosis. This was subsequently used extensively by Koch.

An entirely new discovery was made by Behring in 1890,

when he showed that animals could be rendered immune to the diphtheria bacillus by the administration of the blood serum of another animal which had obtained a high degree of immunity against the disease. Kitasato showed a similar serum which was applicable to tetanus. Behring enunciated his law thus: "If we produce in an animal readily susceptible to the infective disease a high degree of immunity, substances appear in its blood serum by means of which it is possible to convey the immunity to a second animal." This method is known as passive immunization; that is to say, where the body takes no part in the effort to produce immunity. In contradistinction to this, the immunity produced by antigens (vaccines) is called "active immunity" (Ehrlich), because the animal produces its own immunity by its reaction to nonlethal doses of the poison. As time has to elapse after the administration of the antigen before "active immunity" can be produced, it necessarily follows that "passive immunity" is more suitable for the treatment of acute diseases with short incubation periods, whilst "active immunity" can be practiced in chronic infections and diseases with long incubation periods, if the treatment is begun soon after the infection has taken place. It is probable that "active immunity" is more lasting in its effects, in that it is produced by the cells of the patient. In both methods the earlier the treatment is commenced the more likely it is to be successful—in "passive immunity" because the toxin is neutralized before it can combine with the cells of the tissue, and in "active immunity" the cells of the body are more likely to respond to the stimulus of the antigen if they have not already been affected by autoinoculation from the diseased focus. For this reason also small local lesions are more likely to yield to treatment than larger ones.

Although the scientific study of humoral pathology is of comparatively recent date, it has led to great advances in the pathology and treatment of ophthalmic diseases, some of which, previous to the introduction of serum and vaccine therapy, were most intractable. The inoculation of the gonococcus into the conjunctiva for the cure of trachoma was the first record of vaccination used in the treatment of a purely ophthalmic disease. It was abandoned as a dangerous remedy. Jequirity was next used for the same disease, and was

for a time given up for the same reason. The discovery of the ferment abrin and the production of the antitoxin has not only brought it into use again, but has largely helped in the study of the laws which govern immunity and the means by which it is produced.

Antigens is a generic term, used to indicate any agent of an organic composition which, when introduced into the body, forms substances in the blood serum which may be so poisonous to the animal as to produce molecular or total death. The host into which they are introduced in sublethal doses reacts by producing antibodies which tend to neutralize their harmful effect.

Belonging to this group are the pathogenic bacteria. The effect they produce on the body is due to an antigen which may be contained within the organism itself—endotoxin—as in the case of the typhoid bacillus; or which may be secreted by the organism and absorbed into the blood, as is the case with the bacillus of diphtheria.

Pathogenic bacteria, when introduced into the body, produce substances which, gaining access to circulation, may have a harmful effect on the animal; the host reacts by producing specific bodies which tend to neutralize their effect. The following antigens derived from bacteria and their resulting antibodies have been described:

Toxinogens or toxins are substances which induce the production of antitoxins which neutralize the toxin.

Agglutinogens induce the production of agglutins, which cause agglutination of the antigens.

Precipitinogens induce the production of precipitins, which in their turn cause precipitation of the antigens.

Lysinogens induce the production of lysins, which dissolve the antigens which in some instances are bacteria.

Opsoninogens induce the production of opsonins; these substances act on the body of the antigens and so alter the external surface as to allow them to be taken up by the leucocytes.

Aggressinogens give rise to aggressins. The latter neutralize those products of bacteria which paralyze the leucocytes.

When antigens are introduced into the body in sublethal doses they produce in the serum the antibodies already mentioned, namely, antitoxins, agglutins, precipitins, lysins, op-

sonins and aggressins, respectively. In the case of antitoxins, opsonins, and lysins, it is definitely proved that these substances are defensive in their action. It is probable also that the other substances play a part in immunity, but their exact function has not yet been demonstrated.

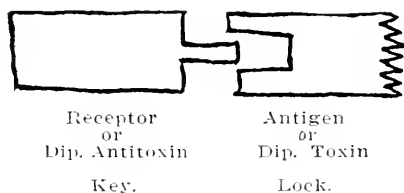
Antitoxin appears in the blood serum of an animal after the injection of gradually increasing sublethal doses of toxin, and is produced by the cells of the body; this was proved in the case of the toxin of jequirity (abrin), by the grafting of a piece of conjunctiva, from a rabbit the subject of jequirity conjunctivitis, into another rabbit, which was thereby rendered immune to the action of the jequirity on its conjunctiva.

If an antitoxin is present in an animal's serum and a dose of toxin be administered, the antitoxin enters into a biochemic combination with the toxin and renders it inert.

The experiment may be carried out in a test tube, the toxin and antitoxin being first mixed and then injected into the animal. The same amount of antitoxin is required to neutralize an equal amount of toxin and combine by the law of multiples which distinguishes it from antibacterial serum; thus if .1 gram of antitoxic serum confers protection against a lethal dose of .2 gram of toxin, .2 gram will confer protection against .4 gram. The reaction is specific. If a toxin be injected into an animal and at some interval the antitoxin be administered, the animal may or may not recover, the result depending on the length of time the antitoxin is administered after the toxin. The toxin enters into union with cells of the animal; the antitoxin, if administered late in the course of the disease, is then unable to dissociate this compound. The action of the toxin continues and death ensues. Hence the importance of the early administration of antitoxin in diphtheria.

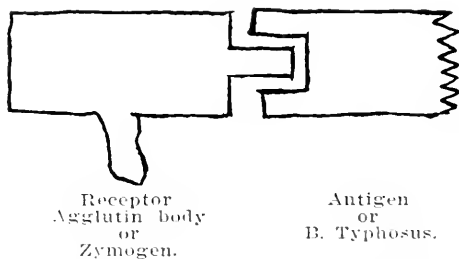
To explain the formation and reaction of the various antibodies, Ehrlich propounded his "side chain" theory, on the principle analogous to the benzene ring in chemistry. He supposed that every cell had figurative arms by which they attach to themselves nutrition, toxins, etc. These arms he called receptors. The ultimate effect on the cell of the injection of a sublethal dose of the poison is an overproduction of these receptors which are thrown off into the blood and there confer on the animal an immunity (antitoxin). Thus if a sublethal dose of diphtheria toxin be administered,

there would be an overproduction of receptors or antitoxin formed in the blood; the serum from this animal would contain receptors, and were serum containing these administered to a patient with diphtheria they would combine with the toxin (antigen) and so render the latter inert. The action of the antitoxin is specific; that is to say, the receptor must belong to the same group as that of the antigen. The receptor has been compared to a key and the antigen to a lock. Before the lock can be opened the wards of the key must fit the lock.



A receptor of the first order is the term applied to the reaction by Ehrlich.

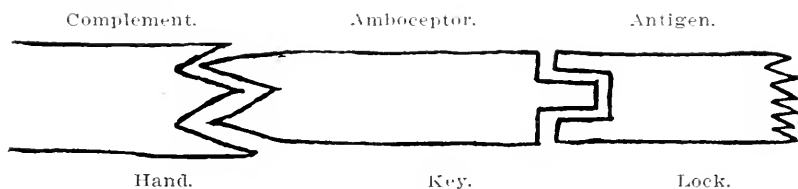
Precipitins and agglutins have a receptor of a different order which has attached to it a special substance (zymogen), the specific action of which is so to alter the antigen as to produce agglutination or precipitation. Thus in the case of bacillus typhosus the presence of the zymogen attached to the receptor in the serum of the typhoid patient causes the bacilli in suspension to run together (agglutination. Widal reaction).



A receptor of the second order is the term applied by Ehrlich to the reaction.

Precipitins and agglutins present no known therapeutic value and are used only as tests for the presence of the organisms.

Lysins (e. g., bacteriolysin, hemolysin). Bacteriolysin is a substance present in an "immunized serum," which dissolves bacteria. This immunized serum is produced by the injection into an animal of sublethal doses of the organism. These antibacterial sera are not much used, owing to the fear that their action on the antigens present in the body might liberate large quantities of toxin and so cause death, and at present are used only as a means of diagnosis. They are distinguished from antitoxic sera by the fact that they do not act according to the law of multiples. Immunized serum, on heating to 56.5° C., for half an hour, loses its power of dissolving bacteria, but if a little fresh serum, which may come from an immunized animal, be added, this power is regained. Therefore, two bodies are present in this serum: (1) a heat resisting substance, and (2) a substance destroyed by heat which is known as the complement or alexin. The receptor which resists the action of heat in this instance is double ended and is therefore known as the amboceptor. By the one end it is capable of attaching to itself the antigen or bacteria and to the other the complement or substance which is destroyed by heat. The amboceptor combines first with the antigen, which sensitizes it, and afterward with the complement, which dissolves it. Immunized serum, which has been treated by heating it to 56.50° C. for half an hour, is known as "inactivated," as the serum cannot exert its lytic power, but can be "activated" again by the addition of a small quantity of serum from any immunized animal, as it contains the complement.



A receptor of the third order is the term applied to the reaction by Ehrlich.

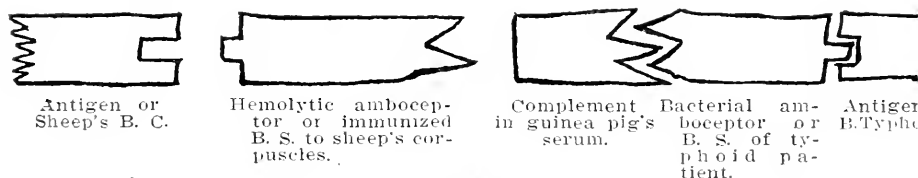
The union of the amboceptor with the antigen is specific, but the complement is not specific; from whatever serum derived, it will act on any form of amboceptor so as to produce union with the specific antigen. To apply the simile again,

the key can be turned in the lock by any hand, the hand representing the complement.

Cytolysins. Antigens are not always bacteria. Emulsions of animal cells, provided they be not of the same species; animal and vegetable fluids, such as abrin, when injected into animals, produce antibodies in the serum. Thus, if the red blood corpuscles of a pigeon be injected into the peritoneal cavity of a guinea pig, a lysin (hemolysin) is produced in the guinea pig's blood serum which will dissolve the red blood corpuscles of a pigeon. This latter reaction may be carried out in a test tube, the disintegration of the blood corpuscles being shown by the discharge of their hemoglobin—a condition known as hemolysis or laking. If the immunized guinea pig's blood serum be heated to 56.50° C. for half an hour before it is added to the red blood corpuscle, hemolysis does not take place, because the complement has been destroyed by heat; but hemolysis will take place if fresh serum from another animal, such as a guinea pig which has not been immunized to a rabbit's blood, is added to it. The biochemic union which takes place between the amboceptor and the antigen on the one hand and the complement on the other is a very firm one, and upon this fact Bordet and Gengou have introduced a reaction which has gone far to revolutionize clinical medicine and probably may help very considerably in the diagnosis of many diseases of the eye. If the complement is engaged with its complementophile affinity of an amboceptor, developed as the result of bacterial infection, it cannot be dissociated and therefore cannot act upon the complementophile affinity of hemolytic amboceptor, such as is developed as the result of immunizing one animal against the red blood corpuscles of another. The complement being "fixed" to the bacterial amboceptor, cannot act on the hemolytic amboceptor, and so no hemolysis is produced. Thus, if we take an emulsion of typhoid organisms and "inactivated" serum (the complement being destroyed by heat) obtained from a typhoid patient (and therefore containing the typhoid amboceptor) and the serum of a normal guinea pig which is rich in complement* and mix them together, the complement will combine with the typhoid amboceptor. If, then, to this be added a mixture containing the "inactivated" serum of a

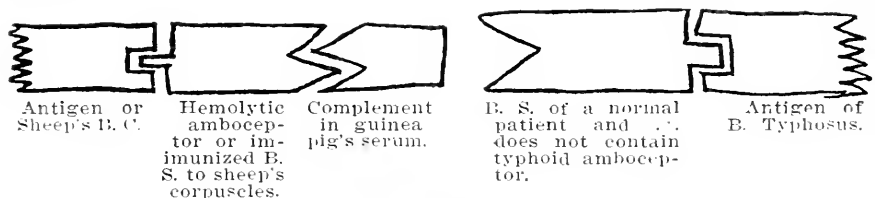
*It is essential that the amount should be standardized.

rabbit immunized to sheep's blood corpuscles (and therefore contains a hemolytic amboceptor) and sheep's blood corpuscles in suspension, no hemolysis takes place, because the complement in the guinea pig's blood serum has been already "fixed" to the typhoid amboceptor and is no longer free to act upon the hemolytic amboceptor attached to the sheep's blood corpuscles; therefore no hemolysis takes place. If, on the other hand, the experiment be repeated (substituting the serum of a normal person for that of the typhoid patient, no typhoid amboceptor being present), hemolysis will take place, because the normal serum contains no typhoid amboceptor, the complement will not be "fixed" to it, but will be free to combine with the hemolytic amboceptor. Hemolysis will therefore result.



NO HEMOLYSIS.

The complement having combined with the complementophile affinity of the typhoid amboceptor.



HEMOLYSIS.

The complement combining with the complementophile affinity of the hemolytic amboceptor, as there was no typhoid amboceptor present with which it could combine.

The test in this form is applicable only to organisms which can be cultivated outside the body, and it has been already successfully applied to tubercle, especially when the absorption time is calculated,* cerebrospinal meningitis, gonorrheal infections and hydatid disease.

*Emery—Hunterian Lectures, 1911.

In the case of tubercle, the test as ordinarily performed is unreliable except in the case of small children, as small obsolete foci of the disease are frequently present in adults.

Emery (Hunterian Lectures, 1911) has improved the method by estimation of the amount of amboceptor present, or, in other words, by estimating the time it takes for the complement to be absorbed by the bacterial amboceptor.

Further, he uses human blood corpuscles instead of sheep's for the hemolytic antigen, and rabbit's blood serum immunized to human blood cells for the hemolytic amboceptor, the latter of which can be prepared, inactivated and kept in sealed capsules ready for use.

The bacterial side, consisting of the amboceptor, antigen and complement (of a known quantity), is first prepared in six separate tubes and incubated in a water bath for two and one-half, five, ten, fifteen, twenty, twenty-five minutes. The hemolytic amboceptor and antigen are then added, and the time at which the hemolysis stops is noted, representing the time required for the absorption of the complement, anything under ten minutes being regarded as a positive reaction.

Upon these principles depends the serodiagnosis of syphilis introduced by Wassermann; that is to say, the diagnosis of syphilis by the fixation of the complement. It is carried out as in the previous experiment, except that instead of using the bacillus typhosus, the liver or spleen of the syphilitic fetus is ground up so as to get at the spirocheta pallida and employed as the antigen. The supposed syphilitic serum (containing the specific amboceptor) is obtained from the blood serum of the suspected patient, while the other ingredients are the same as in the previous experiment. If the syphilitic amboceptor be present in the serum, no hemolysis takes place, but if it be not present, hemolysis takes place, owing to the complement not being "fixed," but free to combine with the hemolytic amboceptor.

Although the method given above was the original way the test was carried out, it has since been found that the syphilitic antigen may be replaced by alcoholic extract of syphilitic and normal liver or heart muscle, and although this might render the reader skeptical as to its value, as a matter of practical experience the test is reliable. Leber, in undoubted syphilitic lesions of the eye, obtained a positive re-

action in 92.2 per cent; in interstitial keratitis, 83.3 per cent; in iritis, 33.3 per cent; in choroiditis and retinitis, 28.0 per cent.

Using the aqueous as the amboceptor instead of the blood serum, the same results were obtained, as the antibody is found in it.

Opsonin is a substance which when present in the serum acts upon the organisms, making them more readily taken up by the phagocytes and digested by them. The change is probably due to some alteration in surface tension between the organism and the leucocyte. Recent research suggests that this is dependent on the action of the opsonin on the antigen, which alters the surface tension of the latter and allows the organism to be attracted by the phagocyte. The substance, although present to a certain extent in all blood sera, may be considerably increased by the injections of cultures of dead organisms in suitable doses. The opsonin contents of the serum may be above or below the normal, according to the time it is estimated after inoculation. Immediately after the injection of the organisms there is a slight decrease in this substance (negative phase), which is soon followed by a considerable increase in its production (positive phase).

Vaccine therapy largely depends upon this principle. Opsonin, like lysin, is specific in its action; e. g., the injection of dead staphylococci will produce an opsonin that will act only on staphylococci, and will have no effect on other organisms. So specific is it indeed that frequently only the same strain of staphylococci as that obtained from the patient will act satisfactorily. It is therefore important in most cases, whenever possible, to obtain a cultivation of the organisms for the preparation of the vaccine from the actual lesion to be treated.

The vaccine is prepared by taking a cultivation of the organism and removing it from the medium by washing with saline solution. In this emulsion the organisms are then killed by heating at 60° C. for an hour on each of two successive days. It is subsequently standardized so that the dose can be calculated. This is usually performed by mixing volumes of blood and the emulsion and counting under a microscope the relative number of the blood corpuscles with

the organisms. As there are 5,000,000 red corpuscles to the cubic millimeter of the blood, it is easy then to calculate the number of organisms in the vaccine. (For the preparation of tubercular vaccine, see page 690.)

In ophthalmic diseases the effect of the vaccine can be estimated so accurately by observing the local reaction in the eye, that no other control is necessary, but where other large lesions, such as phthisis, are present, from which the patient may be making his own opsonin by autoinoculation, or hypersensitiveness (anaphylaxis) is present, it is necessary to control it by the opsonic index.

The opsonic index is obtained by mixing in a capillary tube blood serum from the patient (which contains the opsonin), polymorphonuclear leucocytes taken from a normal person, and the organism for which the index is being taken. A control experiment is made, substituting the blood serum of a normal person for that of the patient. The capillary tubes are put into an incubator for twenty minutes and then spread out on separate slides and stained. The number of organisms in a given number of leucocytes is counted in each case. The number found in the specimen with the normal blood serum is taken as the index and is divided into the number contained in the leucocytes of the second specimen with the patient's blood serum in it. This gives the opsonic index. Thus, if in 40 leucocytes in the preparation with normal serum there are 100 bacteria, and in 40 leucocytes of the preparation with the patient's serum there are 50 bacteria, the opsonic index will be $50/100 = .5$.

Aggressins. At present little is known of the constitution of these bodies beyond the fact that they stop the paralyzing action of aggressinogen on the leucocytes. It is probable that aggressinogen is the cause of the condition known as negative chemiotaxis.

Anaphylaxis or the hypersensitiveness of the tissues to the antigen is due to the presence of a similar antigen in the body. Thus, in tubercle the administration of minute doses of the toxin (tuberculin) will produce either a local or general reaction. Upon this principle the local tests introduced by Calmette, Moro, von Pirquet depend. Also the general reaction with a rise of temperature following the injection of tuberculin is due to the same cause. The same hypersensitive-

ness may also be present for antitoxic bodies, as, for instance, in the administration of the diphtheria antitoxin to a person who has already had the disease or to whom antitoxin has previously been given. It shows itself locally in from eight to ten days after the injection of the serum.

Eight to twelve days after the injection of the serum a swelling may be formed at the site of the lesion. This may be accompanied by a temperature, edema and swelling of the glands and joints. It usually passes off. It is more liable to occur after the second injection of the serum than the first. In a few cases where the serum has been administered a second time, after an interval of more than twenty days, the patient has almost immediately collapsed and died. Death is due to a sudden fall of blood pressure and body temperature, probably due to the action of the serum on the nerve centers. It is an argument against the use of the serum in any cases except true infection with the Klebs-Loeffler bacillus.

Besredka¹ has pointed out that anaphylactic attacks may be prevented by first giving an enema of the serum before using it by subcutaneous injection.

The action of sera and vaccines being so specific, it is most essential that the cause of the inflammation should be accurately diagnosed. It may be possible to recognize the cause of the disease by one of the following means:

(a) The clinical changes set up by the organism may be characteristic and distinctive.

(b) The organism may be found on microscopic examination of the secretion or in the intraocular fluids.

(c) The histologic appearances of the affected tissue may be so characteristic as to reveal its nature.

(d) Biochemic examination of the changes produced in the blood serum or fluid obtained from the anterior chamber. Precipitation, agglutination, Bordet reaction.

(e) The reaction produced by the introduction into the blood stream of small doses of the dead organism (vaccine) similar to that causing the lesion (anaphylaxis). This may be seen (1) locally at the site of the lesion, (2) in the blood; it may be gauged by the opsonic index or biochemic reaction, (3) or in the whole organism by the production of fever.

(f) The local reaction of the tissues to vaccine (surface inoculation), due to anaphylaxis, e. g., von Pirquet, Moro, Calmette.

(g) The inoculation of the diseased tissues into animals will reproduce the disease in a more typical form if the animal be susceptible.

As a general rule, it is on such presumptive evidence as has been given that diagnosis has to be made, but if an organism is present, absolute certainty as to the cause of the disease may be obtained if the microorganism fulfills the following characteristics:

- (a) The organism must be found in the tissues.
- (b) It must be isolated and cultivated.
- (c) Inoculated into man or animals, it must produce the same disease in which the organism is again found.
- (d) Similar chemical products should be found on cultivation of the organism on media as in the body.
- (e) A specific serum reaction, agglutination or bacteriolytic reaction should be obtained if the blood of an infected person be allowed to act on the specific organism producing the disease.

THE PREPARATION OF SERA AND VACCINES USED FOR THE TREATMENT OF OPHTHALMIC DISEASES.

Sera.—Protective sera act by either their antitoxic, bacteriolytic or opsonic powers. There is no evidence at present that agglutination or precipitation play any part in immunity. The principles underlying their preparation have already been discussed.

For the production of immunizing sera an animal should be selected which has a poor natural resistance for the organism, since a higher degree of immunity can be imparted to the serum of such an animal than to one which is naturally immune. Even animals of the same species vary in the amount of immune body which they will form in their serum after the same dose of the antigen. The animal also must be of such a size that a sufficient quantity of serum can be obtained from it.

The animal is injected with increasing doses of the antigen at five to ten days' interval, until it reaches such a high degree of immunity that it will stand many times the lethal dose of the antigen without reaction. The time this takes varies considerably with the amount of the antigen used and the individual peculiarity of the animal injected.

The blood is withdrawn in carefully sterilized vessels and the serum allowed to separate. Its protective power is then estimated in units of immunity (U. I.), as will be described under diphtheria antitoxin, and is then put up into sealed glass capsules ready for use. In some instances the serum may be dried and redissolved in saline solution before use. Throughout the whole process it is needless to say that careful aseptic precautions must be preserved.

Diphtheria serum is an antitoxic serum. The treatment of diphtheritic conjunctivitis by serum is founded on the fact that the Klebs-Loeffler bacillus is a local infection of the conjunctiva with the organism, from which lesion toxins are absorbed into the blood and set up general systemic changes. It is only in exceptionally severe cases that the organism is found in the blood. A serum treatment has for its object the neutralization of the toxins absorbed and of assisting in the resolution of the local lesion. Further, the serum can be used as a prophylactic agent for those who have been exposed to infection, such as when the discharge from a diphtheritic patient goes into the eye of the nurse or surgeon. The antitoxin is now obtained entirely from horses by injecting increasing doses of the sterilized culture of the Klebs-Loeffler bacillus.

The method of standardization of the serum obtained in this manner was introduced by Behring² and Ehrlich³ and expressed in units of immunity (U. I.). Thus by 1 U. I. is meant the quantity of antitoxin which is sufficient to protect a guinea pig weighing 250 grammes against 100 lethal doses of diphtheria toxin. If 1 cc. of serum contains 1 U. I. it is designated as a normal serum. If it contains 100 U. I. in 1 cc. it is called a 100 fold.

Serum once prepared and aseptic will keep as long as three years without losing its property, provided it be kept away from light and in the cool.

As a marketable article the serum is usually sold in the following strengths: 200 U. I., 600 U. I., 1000 U. I., 1500 U. I., 2000 U. I., 3000 U. I. The dose required for prophylaxis is 600 U. I. For treatment 1500 U. I. is usually given, but larger doses may be given in severe cases (see page 696).

In rare cases the treatment fails. It is probable that this is due to the organism used in producing the toxin being dif-

ferent from the organism attacking the patient. For this reason it is probably better to use a mixed cultivation and not to keep it too long recultivated without the addition of fresh organisms obtained from virulent cases. For its use in diphtheritic conjunctivitis see pages 695--697.

Tetanus serum.—Like diphtheria serum, tetanus serum is a purely antitoxic serum. Tetanus similarly is a local disease with symptoms due to the absorption of toxin from the wound. Although a powerful antitoxin can be prepared, as shown by Behring and Kitasato,⁴ which confers a high protective immunity when administered prophylactically, it does not unfortunately have such a good effect as is the case with diphtheria when once the disease is established, probably owing to the fact that the toxin combines more readily with the cells of the tissues and cannot easily be dissociated by means of the antitoxin. As the toxin especially affects the nervous system, in cases where the disease has developed, it is sometimes given into the ventricle of the brain or the subarachnoid space of the spinal cord, otherwise it is given locally near the wound.

The serum as now prepared by Tizzoni⁵ is a dried product containing one million U. I. to the gram. It is prepared by dissolving it in 1 to 10 parts of distilled water. The dose is usually 5 to 10 cc. of this mixture, but 2.5 grams may be given in a single dose in severe cases. It has been in use in cases of wounds about the eye; thus Ellis⁶ has had two recoveries out of three cases. A case of recovery has also been reported by Lewis.⁷

Streptococcic serum.—The early attempts at the production of antistreptococcic serum on the same principle as diphtheria antitoxin failed, as it was found impossible to obtain a toxin sufficiently strong enough to prepare the antigen. Denys⁸ in 1896 prepared a serum which he showed contained opsonin. Marimorek⁹ in 1895 obtained a serum from a single strain of streptococcus which protected animals against the same strain but not against other strains.

Again, mixed strains of organisms were used, and although a high degree of virulence was obtained by the passage of these organisms through animals, it was found that they were nonpathogenic to man. In preparing the antigen, therefore, mixed cultivations derived directly from man must be used.¹⁰ Horses are the animals usually used in its preparation. Al-

though there is undoubted evidence to show that the serum confers protection, its unreliability for practical use is probably due to two factors: (1) It is rarely in severe cases that the serum can be administered sufficiently early before general infection has taken place; (2) unless a similar strain as the organism causing the disease has been used in the preparation of the serum, it is not effective.

The dose usually given is 20 cc. repeated every second day until a dose of 60 cc. has been administered. It has been used in streptococcal infection of the conjunctiva, and also has been used as an immunizing agent before operations.

Pneumococcus serum. (Fränkel.)—A. Fränkel showed that some degree of immunity could be produced by inoculating rabbits with the pneumococcus. Pane,¹¹ Eyre and Washbourn¹² and other observers have prepared antitoxic and antibacterial sera which have conferred immunity to animals, but have not shown altogether satisfactory results in the human subject. P. Römer¹³ obtained a pneumococcal serum by injecting the organism obtained from pneumococcal corneal ulceration into cattle and horses and mixing the sera so obtained. Unfortunately, owing to the low virulence of the antigen, no standardization of the serum was possible, and its value can only be empirically determined after injection into the human subject. More recently Landmann¹⁴ has prepared a serum from virulent organisms obtained from pneumonia, and so has obtained a standardizable serum. The serum can be procured from Merck of Darmstadt and contains 20 U. I. in 1 cc. The organism is closely allied to the streptococcus, and probably for the same reasons that the anti-streptococcic serum is doubtful in its action, the pneumococcus is also uncertain.

In pneumococcal corneal ulceration the dose is 200 U. I. injected into the buttock. It can also be used locally as drops every hour.

The value of the treatment has been upheld by zur Nedden, Paul, O. Zeller, Mayweg, Sattler, B. Castresana, Helbronn, A. Vossius, Th. Axenfeld. (See also page 704.)

It has also been used as an immunizing agent in intraocular operations and in cases of orbital cellulitis due to the organism.

Gonococcic serum is prepared by the injection of unsterilized cultures of virulent strains of the gonococcus into the

peritoneal cavity of sheep or rabbits. It is an antitoxic serum, but does not possess very high immunizing power, owing to the fact that the animals used are not readily susceptible to the gonococcus, the gonococcus being essentially a human parasite. The serum has been used in gonorrheal conjunctivitis and iritis. (See pages 699, 709.)

Tuberculosis sera have been prepared by the injection of bacillary pulp into horses. According to Maragliano¹⁵ this serum contains agglutin, bacteriolysin and antitoxins. The serum as prepared by him contains 1000 U. I. in the cc., so that one-fourth of a cc. is enough to protect a guinea pig of 250 grams against a single lethal dose.

Marmorek's¹⁶ serum is a purely antitoxic serum prepared from horses treated by young cultures of bacilli grown on a medium containing serum from the part of the body where the lesion to be treated subsequently with the serum is situated.

Both sera have not been much used in ophthalmology, and in other parts of the body it is doubtful whether they are of much value.

Jequiritol and jequiritol serum.—In 1882 de Wecker aroused the interest of ophthalmic surgeons by using an infusion of the seeds of the jequirity plant in the treatment of trachoma. The infusion when applied to the conjunctiva produced a very acute membranous conjunctivitis, and when it had cleared up the trachoma also disappeared with it. Unfortunately the action was sometimes so severe that the cornea was destroyed.

Kobert in 1889 demonstrated the presence of an unorganized ferment in the form of a toxalbumin which is now known as abrin; it can be isolated in a pure state and acts on the conjunctiva in a similar manner to jequirity.

Éhrlich performed experiments on animals and showed that by feeding them on abrin a high degree of resistance to the poison can be produced, due to an antitoxin which is present in the serum, which he called "antiabrin."

Römer showed that the antitoxin was formed by the tissue cells, by transplanting a piece of conjunctiva from a rabbit which had had jequirity ophthalmia into another rabbit and thereby rendered the second rabbit immune to jequirity.

Jequiritol is an abrin preparation derived from the seeds of the *abrus precatorius*, the ferment being killed by sterili-

zation and the toxin dissolved in 50 per cent glycerin. It is standardized so as to possess a definite uniform physiologic value, and it is issued in four strengths for application. (See page 702. It has been used in trachoma, especially in cases with pannus, corneal opacities of recent origin, and by injection into recurrent malignant disease of the orbit.¹⁷ (See page 703.)

Jequiritol serum is an antitoxic serum prepared and standardized on the Behring principle. Its immunizing power is so great that .1 cc. is sufficient to protect a white mouse against 100 lethal doses of jequiritol if they are injected together. It is used locally or by hypodermic injection (see page 702 to diminish the action of jequiritol or abrin conjunctivitis.

Cytolytic sera.—Hemolytic sera prepared by the injection of human red blood corpuscles into the rabbit have been used by Römer in cases of hemorrhage into the vitreous, by injecting it into that body, with the idea of producing rapid dissolution of the blood cells and the prevention of the formation of fibrous tissue bands in the vitreous. The results of the treatment are of doubtful value. Indeed the injection is probably not without considerable risk, and as the serum may contain other cytolytic bodies, it is not improbable that it might affect the retina or intraocular blood vessels.

Deutschmann's serum.¹⁸—It has been shown that the administration of yeast to animals raises the general opsonic index of the serum. Deutschmann has employed this serum in the treatment of ophthalmic diseases. The opinion of observers is that it is of doubtful value. A similar report on the serum as used for disease in other parts of the body is given.

Antithyroidin (Moebius).—Although not strictly belonging to ophthalmology, mention should be made of the effects of the administration of serum or milk derived from thyroidectomized goats or sheep on exophthalmic goitre.

Moebius¹⁹ first put forward the theory (1886) that the symptoms in Grave's disease were due to toxic substances discharged into the blood from the enlarged thyroid gland. He also held, and this has been observed by many observers, that the patients were benefited by the use of serum derived from thyroidectomized sheep. It is now sold in dry tablets, equivalent to .5 cc. of serum. They are administered as fol-

lows: On the first and second day, one three times a day; on the third and fourth day, two three times a day; on the fifth and sixth day, two four times a day; on the seventh and eighth day, two five times a day. After the eleventh day, about which time the symptoms begin to disappear, the dose is gradually diminished.

In cases of exophthalmic goitre in the early stages the exophthalmos will sometimes subside entirely.

PREPARATION OF VACCINES. GENERAL PRINCIPLES.

Bacterial vaccines may be defined as sterilized, standardized emulsions of microorganisms, except in a few instances, such as hydrophobia, where the actual organism or its toxins are used.

To prepare vaccines the following are the steps usually taken:

1. Determine the organism causing the disease.
2. Make a forty-eight-hour culture on solid medium from the patient suffering from the disease, taking care to select a lesion that is likely to be free from contamination with other organisms.
3. Add to the tube a small quantity of sterile normal saline solution; then shake gently so that the colonies are washed off from the medium.
4. Pour off the fluid and dilute with sterile normal saline solution until the fluid is only slightly opalescent.
5. Standardize the solution by the estimation of the number of organisms. This is best performed by mixing equal parts of the emulsion and diluted blood and counting the number of corpuscles in several fields of the microscope. This is performed in the following way:
 - (a) Prick the finger and wipe away the first drop of blood. When the second drop forms, draw it up into a capillary tube to a certain mark.
 - (b) Allow a small bubble of air to enter and then draw up four times the quantity of sodium citrate and normal saline solution. (Tabloids are prepared of this mixture, as the solution does not keep well.)
 - (c) Blow the whole out onto a slide and mix thoroughly.
 - (d) There is then a mixture which contains one million red blood corpuscles to one millimeter of fluid.

(e) Draw up into another tube equal parts of this mixture and of the fluid containing these organisms. Mix thoroughly on a slide. Make a smear preparation of the mixture, stain with Leishmann's stain and count the organisms and corpuscles in ten fields of the microscope. This is much facilitated by the use of Ehrlich's eyepiece, which divides the fields into squares.

(f) Having estimated the proportion between the red blood corpuscle and the organism, it is easy to calculate the number of each. If there are 50 red blood corpuscles and 10 organisms, the proportion will be as 1 is to 5. In a cubic centimeter of diluted blood there are, therefore, 1000 red blood corpuscles; therefore in a millimeter of fluid there is one-fifth of that amount, namely, 200 organisms.

6. Bottle off the fluid containing the organisms into sterile capsules and heat them in hot water at 60° C. for an hour, taking care that the water covers the capsules entirely.

7. Test for sterility. Open a capsule; make a cultivation from the contents; place in incubator. If sterile it is ready for use.

For hospital use, where the vaccines are used daily, a stock cultivation may be made and the top of the flask covered with a piece of sterilized India rubber. This is washed over with 1 in 20, the hypodermic needle thrust through it, and the dose withdrawn, the hole being subsequently sealed with collodium.

The above is the method usually employed for the preparation of vaccines. There are also one or two special points about the preparation of individual vaccines.

As many organisms lose their virulence in cultivation, it is important to prepare the vaccine from the original cultivation and not use a subcultivation. Such is the case with the gonococcus, pneumococcus, and streptococcus.

In the case of the gonococcus an agar tube may be used, and ophthalmia neonatorum is the best material from which to gain the cultivation. The pus is smeared thickly all over the agar, as unless human blood serum is present the organism will not grow readily. It should be incubated for at least forty-eight hours.

In the case of the staphylococcus, this organism does not lose its virulence rapidly on cultivation, and therefore subcultures can be used. The best way of obtaining a large

quantity of vaccine is first to make an original cultivation on agar, add to this a little saline solution, and pour the emulsion of bacteria so obtained over the surface of several agar tubes or plate bottles. Twenty-four-hour cultures are best used.

Tubercular vaccine.—The tubercle bacillus being so extremely toxic and the patient on whom it is used hypersensitive, the vaccine prepared therefrom has undergone many modifications. The tuberculous toxin is known as tuberculin. In 1890 Koch first introduced it in the treatment of tuberculosis. But unfortunately the doses recommended by him were much too large, the result being that, although very effective in some cases, death from general tuberculosis occurred in others, and for a time it was completely given up, as it was thought to be too dangerous. Wright, on the introduction of his method of determining the opsonic index, showed how small doses could be given with safety. Before this many forms of tuberculin were made by Koch to try and get rid of some of the toxic effects of the bacilli. Hence a number of forms of tuberculin have appeared from time to time. In all probability no one is better than another, provided the dose is sufficiently small.

The experiments which led up to their production were as follows: Koch first injected a pure sterile culture of the organism and found that an abscess was formed at the site of inoculation and that the animal died from tuberculosis. He therefore took a pure cultivation of the tubercle bacillus, grown four to six weeks on a 5 per cent glycerin broth, filtered it, and concentrated his filtrate to one-tenth. This filtrate is now known as Old Tuberculin, and therefore only contains the toxins and no bacilli. It was found in the dose then given to cause too great general reaction, and further, also, that there was a possible fallacy in that there would only be an antitoxin produced by the injection of the toxin and no lytic properties against the bacillus.

To obtain the endotoxin he therefore employed the following method: Young virulent cultures were dried in vacuo and ground up till no whole bacilli were left. Distilled water was then added and the mixture centrifugalized. The upper layers were pipetted and found to possess the same properties as the Old Tuberculin. This was called T. O. (tuberculin

obere). The residue was again dried and the process repeated several times until no residue was left. These supernatant fluids, with the exception of the T. O., were then mixed in proportion so that 1 cc. contained 2 milligrams of solid bacterial substance, representing the immunizing substance of 10 milligrams of the tubercle bacillus. This preparation is known as T. R. (tuberculin rückstand), and is the preparation which I personally have used, and is, in my opinion, the most preferable for use, as it contains a large proportion of endotoxin. More recently Koch found that if simple ground-up bacilli were used without taking off the T. O., the blood serum after its use contained a larger proportion of agglutin bodies. This tuberculin is called B. E. (bacillary emulsion). It contains one part of dried tubercle bacillus pulverized and dissolved in 200 parts of water and glycerin. It is given in about one-fifth the dose of T. R.

OPHTHALMIC DISEASES TREATED BY VACCINES AND SERA.

Before passing to the treatment of the regional diseases by vaccines and sera, I have detailed such clinical and pathologic points as I think bear on the theories which form the foundation of the treatment and such as seem to me desirable to make a correct diagnosis.

The first group of these are affections of the eyelids.

Styes. Recurrent attacks of styes, due to the infection of the glands about the lid margins, is the disease for which the vaccine treatment has been most frequently used by me with uniform success. No case was treated unless the patient had had more than three attacks of styes. Some of the cases had as many as thirty, and local treatment had, in many instances, failed to prevent their recurrence. Thirty cases were treated. In all cases the staphylococcus was found; although occasionally no organisms could be found in the smear preparation, cultivation always showed the organism found to be present. As a rule cultivations showed no other organism, but occasionally colonies of xerosis bacilli were also present. With the exception of seven cases the organism found was the staphylococcus albus. In these cases the staphylococcus aureus was present, and the styes were usually of a more severe character and associated with considerable swelling and edema of the lid. The patients were frequently

"run down" in health, and not infrequently other staphylococcal lesions were present, such as boils on the neck and back, chalazion, acne vulgaris and phlyctenule. In the cases in which the opsonic index was watched, it was often found as low as .5, but in some of the cases it was normal or above. After the vaccine was given there was a drop in the index for about forty-eight hours (negative phase), depending on the amount of vaccine given, and during that time a fresh stye formed in two instances. The opsonic index rose to its highest about the eighth to the tenth day, and remained up during the period of injection. As a rule the three injections sufficed, given at intervals of two weeks. In some cases where there were associated lesions, such as acne and chalazion, the opsonic index was found to drop again after about an interval of six weeks after the last injection, and therefore in these cases a dose of vaccine was again given. In all cases the treatment was effectual in stopping the recurrence of the styes, although in some instances the associated lesions (boils and chalazion) recurred. Beyond local cleansing of the eye with boric lotion and ung. hyd. ox. flav. dil., no other local treatment was used. The vaccine used as a rule was a mixed cultivation of albus and aureus, such as is kept for general use. If styes only are present, this vaccine seems sufficient to prevent their recurrence, but where they are associated with acne, boils, or chalazion, it is very desirable to have a vaccine made from the actual lesion, as the latter diseases do not respond so readily to treatment. As a rule in these cases the first dose was given from the stock cultivation, the subsequent treatment being carried out by a vaccine prepared from the lesion.

Acne vulgaris. This disease is due to the retention of the secretion and suppuration occurring in the glands of the skin. When it is merely the retention of the secretion, it is known as a comedo and can be expressed from the distended mouths of the glands. The reason for the retention of the secretion is not entirely known, but it probably depends on the growth of an organism in the secretion. In the secretion from these glands the staphylococcus albus and aureus and a special bacillus can be found. The latter is probably a saprophyte in the strictest sense of the word, though by its proliferation it may assist the staphylococcus in producing suppuration.

When suppuration has taken place, small scars are left, so that after a time the face becomes characteristically pitted. The chronic inflammation and suppuration takes place in the glands, especially when the patient is "run down" in health; that is to say, when the general resistance is lowered or when the local blood supply to the part is diminished—as when the face has been exposed a long time to cold; that is to say, when the local resistance is lowered.

Although staphylococcus vaccine will frequently cure the disease, the experience of some dermatologists is that a mixed vaccine of the saprophytic bacillus with the staphylococcus is the best remedy.

In four cases which have come under my care with associated lesions (styes and phlyctenulæ), in two cases the acne cleared under treatment with the stock culture of the mixed staphylococcal vaccine. One of the other two did not clear up till a vaccine was made from a pustule on the face, and in the other case, although the phlyctenule in the conjunctiva disappeared for a time and the face improved temporarily, they both returned and the vaccine treatment was ineffectual to stop the recurrence of the attacks.

Four cases of acne rosacea associated with phlyctenulæ and corneal ulceration did not improve under the treatment with staphylococcal vaccine, any more than they would have improved under local treatment with atropin and boric lotion.

Affections of the Meibomian glands. The pathology of acne rosacea is of importance in that it helps to throw some light on the pathology of inflammatory affections of the Meibomian glands. The Meibomian glands are modified sebaceous glands embedded in the tarsal plates of the eyelids, and, like the glands of the skin, are liable to retention of their secretion and inflammation. Before the retention of the secretion can go on to the formation of a so-called tarsal cyst, the tarsal plate must be softened by inflammatory infiltration so as to allow of its distention by the retained secretion and inflammatory exudate.

A disease has been pointed out by Doyen which is analogous to acne vulgaris, in that the Meibomian glands become distended by secretion which in some instances is purulent and can be squeezed out from the open mouths of the glands. From some of these pus may be squeezed, whilst from others

only fatty Meibomian secretion can be expressed. Microscopic examination shows this material to contain the staphylococcus aureus and albus and the bacillus xerosis, the latter being a saprophyte similar to the bacillus found in acne vulgaris. The presence of this purulent secretion from time to time gives rise to attacks of conjunctivitis, especially when the patient is "run down" or has been exposed to "cold." Doyen²⁰ has shown that this disease can be eradicated by the use of staphylococcal vaccine combined with expression of the retained secretion from the Meibomian glands. In two cases of this disease under my care the treatment was successful. In one case a cataract was subsequently removed without intercurrent inflammation.

Multiple and recurrent chalazion. It has already been pointed out that for chalazion to occur there must be inflammation and retention of the glandular secretion. The most common cause of this inflammation is the staphylococcus, although other organisms, such as the pneumobacillus of Friedlander and the streptococcus, have been occasionally described. A microscopic examination of the material is therefore required before treatment is carried out. In ten of my cases the staphylococcus aureus was found in four, the rest being staphylococcus albus. Cultivations were made in all the cases, but in three cases only was the organism found in the smear preparation. Xerosis bacillus was found in nine of the cases.

It seems essential that the vaccine be prepared from a cultivation made from the secretion, as in three cases the disease did not respond to treatment with a mixed stock vaccine, whereas two of the cases in which it so failed cleared up when the vaccine was prepared from the lesion. In some instances, where there were several small chalazions in the lid, they subsided without operation or suppuration taking place. In two cases the treatment failed to stop the formation of the chalazion. One of these was in a patient with phthisis, who was much run down, and the other was in a pregnant woman who was debilitated thereby. But although they did not respond immediately to the treatment, they ultimately improved and recovered. All the other cases made a recovery without the formation of any fresh chalazion after the first injection.

Chronic blepharitis and conjunctivitis. Three cases, which

had existed for over a year with a tendency to ectropion and in which the Morax-Axenfeld bacillus and staphylococcus were found on cultivation, were treated by mixed vaccines prepared from these organisms, but only such improvement as would be obtained by treatment with ordinary lotions was noticed.

Affections of the conjunctiva. The acute diseases of the conjunctiva are not as a rule suitable for treatment by vaccines, since their duration is so short that the vaccine would not have time to produce any immunity. Further, the negative phase produced by the administration of vaccine would make the disease worse for forty-eight hours and lower the vulnerability of the cornea and so render it more likely to be infected. In spite of this risk, the gonococcal vaccine has been tried in ophthalmia neonatorum, but the results obtained, I believe, have not been much superior to the ordinary nitrate of silver treatment, which in most instances was carried out synchronously. I believe in a few cases the average length of time was somewhat reduced by the use of vaccine, but this also is variable when the nitrate of silver method is adopted. The latter treatment has the advantage that there is no risk to the cornea when once the treatment has been established. Other diseases, such as the infection by the Morax-Axenfeld bacillus, yield so readily to treatment that vaccine is unnecessary. It is, therefore, for the very chronic diseases, such as tubercle, that vaccine is most suitable. In the very acute inflammatory diseases of the conjunctiva, where infection of the cornea is likely to take place, "passive immunity" is peculiarly suitable. The serum is used by injection into the tissues—usually the buttock—and is also dropped into the conjunctival sac every hour.

Diphtheritic conjunctivitis. It must be first pointed out that all cases of membranous conjunctivitis are not due to the Klebs-Loeffler bacillus. Thus the streptococcus, staphylococcus, gonococcus and even Koch-Weeks bacillus will give rise to a membrane on the conjunctiva. In diphtheria of the conjunctiva the membrane is most marked on the surface of the palpebral conjunctiva, to which it is firmly adherent, and when peeled off bleeds readily. It may also be associated with a similar membrane in the throat or nose, and in the most severe cases sores may be present on the face cov-

ered with membrane. Albumin is usually present in the urine in these cases.

By far the most important way of making a diagnosis from the point of view of treatment by antitoxin serum is a microscopic examination of the membrane or discharge and the finding of the Klebs-Loeffler bacillus therein.

The bacillus is a straight or slightly curved rod measuring about 3 microns in length, which is about the same thickness as the tubercle bacillus, which stains well with thionin blue and other anilin dyes, and which retains the stain in Gram's method—an all important point in distinguishing it from the other bacilli which are found in the conjunctival sac, with the exception of the xerosis bacillus. The latter organism resembles the Klebs-Loeffler bacillus so closely that without experimental inoculation in animals it cannot be distinguished, although some authorities state that there is some variation in the polar staining by Neisser's method in a twenty-four-hour culture, and that there is a slight difference in the edges of the colonies on agar. Others again say that the agglutination test is reliable when diluted sera are used. As has already been pointed out, the early administration of the antitoxin is of the utmost importance; the diagnosis must be made from the smear preparation taken from the conjunctival sac. Fortunately this is usually conclusive, since the Klebs-Loeffler bacillus is found in such large numbers throughout the preparation as to exclude the possibility of their being xerosis bacilli, which are merely saprophytic organisms and do not occur in such large numbers. In cases of doubt the antitoxin should always be given, but occasionally in mild cases of very doubtful diagnosis it may be withheld. Local treatment by quinin and lotions and nitrate of silver should also be used. The dose usually given is 2000 U. I., injected under the skin of the back or buttock. Careful antiseptic precautions should be preserved. In small children 1000 U. I. is sufficient, but the dose should be regulated more by the severity of the disease than the size of the child. In very severe cases, especially where the cornea is just commencing to be involved, a larger dose, e. g., 6000 U. I., may be given. The serum can also be given by intravenous injection in severe cases. Unfortunately, once the cornea is involved there is little hope of saving it, since the serum does not seem to have the same

power of preventing the spread of the disease in the cornea. (Uthoff and Axenfeld.)

The beneficial results of the treatment by antitoxin are now placed beyond all doubt.²¹ The change becomes apparent in twenty-four hours, the temperature and pulse drop to normal, and although there is some discharge from the eye the membrane shows signs of separation and it finally comes away piecemeal. If after twenty-four hours the symptoms do not abate, another dose of antitoxin should be given.

Although the antitoxin is mainly directed to neutralizing the effects of the toxin, it undoubtedly assists the resolution of the disease, and if one eye only is infected the immunity produced will probably give protection to the other, and also to the mucous membrane of the nose and throat. Nurses and surgeons and people who have laid themselves open to the infection, as when a child coughs into their eye, should be given a prophylactic dose of 600 U. I.

It would not be complete if I did not mention that antidiphtheritic serum has been used for other conditions of the eye, namely, pseudomembranous keratoconjunctivitis, *ulcus serpens*, and other ocular infections.³⁷ Although these and other conditions seem to have derived benefit, it must be pointed out that the essential antitoxin is very specific in its action, and it can hardly, in my opinion, be the cause of the improvement reported. Further, the indiscriminate use of antidiphtheria sera is not without risk of anaphylaxis. (See page 680.)

Streptococcal infection of the conjunctiva varies much in severity. In the most virulent cases it is perhaps the most severe form of inflammation which is met with. It gives rise to a membranous conjunctivitis followed by extensive sloughing of the membrane and destruction of the cornea; infection of the orbit may take place and orbital cellulitis result. Finally, the patient may die of meningitis or septicemia. In the less severe forms a membranous conjunctivitis, with or without sloughing of the cornea, may occur. The latter is especially liable to occur in badly nourished children (*keratomalacia*).

The streptococcus may be found in the discharge in its characteristic chains, but the appearance of the organism may vary; in the most severe cases the organism is usually a very small

one and the chains are short, probably owing to the rapidity of the spread of the disease. So short may they be that the organisms are often found in pairs, so that they may be mistaken for the pneumococcus; indeed, sometimes it is extremely difficult to differentiate between the two organisms, especially after cultivation. In cases of less virulence the organisms are larger and the chains more defined.

For the treatment of the disease by antistreptococcic serum to be successful it must be administered at a very early period of the disease, and the serum must have been prepared from a human strain similar to the one from which the patient is suffering. (See page 684.)

It is obvious, therefore, that even if the disease be treated early with serum, it is a good deal a matter of luck if the correct organism has been used in making the serum, and for this reason a polyvalent serum is more satisfactory than a monovalent one. Considering the severe and intractable nature of the disease, there is no doubt that it should always be tried in these cases, although the hope of success may be small. I have seen it tried in three cases: in two no benefit at all seemed to result from its use; in the third case, although the eye sloughed and the orbit was infected, the progress of the disease seemed to be arrested in that there was a rapid fall in the temperature and a subsidence of the symptoms after its administration.

Further cases are reported by Bull, Ellis, Gibson, Greenwood, etc., in which satisfactory results were obtained.

The serum usually used is "Menzer's streptococcus serum" prepared by Merck from 200 different strains of streptococcus. It is given by hypodermic injection in doses of 10 to 20 cc. and repeated if necessary after an interval of twenty-four to forty-eight hours.

A streptococcus vaccine has been prepared, but the immunity produced by its use does not seem very powerful or lasting. It is possible it may prove to be of some use in the mild forms of infection, as in erysipelas and streptococcus (nucosa) infections of the cornea.²²

Gonococcal infections of the conjunctiva occur in newborn infants (ophthalmia neonatorum) and adults (gonorrheal conjunctivitis). It gives rise to one of the severe forms of conjunctivitis with a grave risk to the cornea, especially in the

latter instance, for in the newborn infant, if it be properly treated, the risk to the cornea is small. The organism can always be obtained in the discharge throughout the attack. Gonococcal serum has been used in the treatment. My own experience is limited to six cases of ophthalmia neonatorum. The serum was obtained from Burroughs and Wellcome's laboratories and injected into the skin of the back and used locally as drops. In three cases it was also injected into the rectum, but this method is unsatisfactory in that it is liable to be returned. Ten to twenty cc. were given and repeated. In one case only did there seem to be any shortening of the duration of the attack, and it is possible this was due to the local treatment which was carried out simultaneously. In three of the cases boric lotion only was used locally. All the cases made a good recovery without infection of the cornea. From the small experience thus gained from these cases I should say that the treatment is not superior to the ordinary nitrate of silver method, and indeed, personally, I would rather trust to it than to the treatment by serum. This is also the experience of other observers.

Gonococcal vaccine. I have already pointed out that the use of vaccines is not without risk, and although it has been used, the beneficial results are somewhat doubtful and do not justify its administration.

Tubercle of the conjunctiva. It has been shown that for ectogenous infection to take place there must be damage to the epithelium. A frequent site is the sulcus subtarsalis, which is also the most common situation for the lodgment of foreign bodies. In this case a nodule forms beneath the epithelium, which subsequently ulcerates, the base of the ulcer being covered with large granulations. A septic condition of the ulcer may follow, leading to infection of the cornea.

Another form of ectogenous infection is the follicular, in which multiple follicles form over the fornix and tarsus, some of which break down and form minute ulcers. These cases usually occur in quite young children.

The commonest way, however, in which tubercle of the conjunctiva manifests itself is in the formation of a coxcomb excrescence in the fornix. Such cases are frequently associated with tuberculosis of the lacrimal sac. Histologically they exhibit very characteristic giant cell systems, but marked

caseation in all conjunctival tubercle is very rare. The tubercle bacillus can frequently be found in and around the giant cells.

Lupus may spread directly to the conjunctival sac from the face, or it may be secondary, due to a local inoculation. In the case of infection directly from the face, lupus invades first the outer surface of the lids, causing ectropion, finally spreading to the conjunctiva. The conjunctiva becomes injected, lupus nodules forming in the subepithelial tissue, which run together and ulcerate; cicatrization subsequently bringing about obliteration of the fornices, with the formation of bands and pouches. As a result partly of the cicatrization and partly of the drying caused by the exposure, a condition of secondary xerosis is produced in the epithelium, whilst in the subconjunctival tissue typical lupus nodules with giant cells and epithelioid cells are found in great quantities, but as a rule the tubercle bacillus cannot be found in them. A condition strongly resembling the pannus of trachoma is found in the cornea with infiltration of the limbus. Sooner or later the cornea becomes infected with pyogenic organisms, resulting in perforating ulceration and destruction of the globe.

Of these forms of tubercle in the conjunctiva treated by tuberculin, my experience is limited to two cases of lupus associated with disease, in both of which, although there was improvement, the tuberculin did not have marked effect; and one case of coxcomb excrescences treated by tuberculin T. R., which cleared up extremely rapidly under the treatment. The following are the notes of the case:

H. K., female, aged 25 years, admitted into the hospital August 1, 1908. Patient states that six weeks ago she got a fly into her eye, but thinks that the swelling which is present in the preauricular and submaxillary glands was present before this. Her mother, four brothers, two sisters and two children have died with phthisis.

In the left lower fornix, occupying about the middle half, is a large coxcomb excrescence, such as is usually found associated with typical tubercle of the conjunctiva. The preauricular and submaxillary glands are enlarged about the size of big walnuts. A small piece of tissue was excised from the excrescence and submitted to microscopic examination. It showed masses of round-celled infiltration with giant cells

and epithelioid cells, and in some situations caseous material. Microscopically the lesion was typical of tuberculosis.

August 21st. The opsonic index was .9 and 1/1000th of tuberculin T. R. was given.

August 30th. Marked improvement was shown. The excrescence in the conjunctiva was much smaller and the glands had also decreased.

On September 7th the opsonic index was 1.9. Tuberculin T. R. 1/250th given. At this time the condition had very much improved. The glands, although they could still be felt, were smaller, and the excrescence in the fornix had nearly disappeared.

On October 16th the glands had gone and could not be felt. There was no trace of anything to be seen in the conjunctiva, which looked normal, entire resolution having taken place.

The success of the tuberculin treatment in this form of tuberculosis of the conjunctiva is also borne out by a case reported by Ormond and Eyre.²³ In their case the treatment extended over a much longer period, namely, four months, but complete resolution took place in the same way.

Trachoma. Although trachoma is probably a chronic, specific, infective disease of the conjunctiva, no organism has yet been discovered to which it can be attributed, and yet it is probable that there is an antigen present. On this supposition I obtained the expressed materials from the conjunctiva from a number of cases, triturated them in saline solution, and sterilized them by heating to 60° for half an hour. This fluid was then injected into the buttock of a patient suffering from a moderately severe trachoma, at an interval of two weeks, in a dose corresponding to the amount of material derived from one expression. In all, five doses were given, the conjunctiva during this period being merely cleansed with boric lotion. It seemed to have no effect in producing arrest of the disease, nor was any local reaction of the conjunctiva noticed.

In one case of severe trachoma, with a large amount of follicular formation present, the expressed material was used on the same patient without sterilization. There was no reaction, either in the eye or at the site of the injection, or change in the conjunctival condition.

Jequirity. As has been pointed out, jequirity was used at

one time in the treatment of trachoma, but it is now given up for the use of the sterilized ferment jequiritol.

Jequiritol and jequiritol serum are used in the treatment of trachoma, especially when it is associated with pannus. The cases for which it is most suitable are those where the lid condition has improved or cicatrized, leaving a thick, fleshy progressive pannus. In three cases where I have used it, in two the results have been excellent. The pannus has disappeared almost entirely, the vision was much improved, and all photophobia disappeared. In the third case, which was a more or less cicatrized pannus with a good deal of corneal opacity, it seemed to do harm rather than good, in that a fresh inflammation was set up in the cornea, the old blood vessels becoming dilated, and there was increased infiltration with the formation of small corneal ulcers near the limbus. The patient remained in this condition for six months before recovery took place, and even after this the corneal condition was not improved.

I think, therefore, it is desirable to use it only in cases of recent pannus. Its action is produced by setting up an acute inflammation in the part, causing an increased blood supply with phagocytosis.

Jequiritol (abrin) is standardized in four strengths by finding the toxic dose for white mice, which are susceptible to the poison. (See page 687.) Number 1 is the weakest; number 4 the strongest. In applying it to the eye it must not come in contact with alcohol or solutions of carbolic, otherwise the toxin is precipitated. It is dropped into the eye by means of a capillary pipette. Römer recommends that number 1 solution should be first instilled, on the first day giving .03 of a cc., increasing the quantity until a reaction is produced. If number 1 solution fails, number 2 is used. By so graduating the doses a reaction is produced by increasing doses given every four to six days. If the inflammation becomes very acute, the serum may be dropped into the eye every four hours, or in very severe cases, subcutaneous injection of the serum may be employed. Personally I have always used number 4 strength, straightaway, painting it directly on the conjunctiva. The reaction it produces is severe. After six to twelve hours the lid becomes swollen and the conjunctiva covered by a fibrinous membrane. There is not at first a large amount of

discharge. I have never been alarmed sufficiently to use the serum either locally or by subcutaneous injection. Personally I prefer this method, in that a beneficial result is more likely to be effectively and rapidly attained than by the more cautious method of administration, and the patient does not develop an immunity, so that the other eye can be treated at once, if necessary, without waiting for the immunity to disappear. It is possible that Römer's method of administration would prove more satisfactory in old cicatricial cases. It has also been tried by this method for other corneal opacities, with some success, but of this I have no experience. It has also been used for injection into recurrent malignant disease of the orbit. One minim doses of number 1 solution should be tried and the dose gradually increased. Large doses may produce sloughing. Cases are reported in which arrest of the growth has followed its use.²⁴

AFFECTIONS OF THE CORNEA.

Corneal ulceration. The two organisms which are pre-eminently associated with severe serpiginous ulceration are the staphylococcus and pneumococcus, the ulceration produced by the latter being more severe than the former. It is particularly for these two forms of ulceration that serum and vaccine therapy have been used. The less severe forms of corneal ulceration, such as that due to the Morax-Axenfeld bacillus, yield so readily to local treatment that they do not call for the use of vaccine. Streptococcal infections have already been treated of under affections of the conjunctiva. (See page 697.)

It is obvious that a bacteriologic examination of the material from the surface of the ulcer is necessary for proper diagnosis before treatment with vaccines or sera is employed. This is best made by scraping the surface of the ulcer with a discission needle and smearing the material so obtained upon microscopic slides and staining it. The organism can frequently be found in enormous numbers in such a smear preparation, except perhaps in the case of staphylococcal infections, where sometimes it is extremely difficult to identify the cause without making cultivations.

Staphylococcal corneal ulceration. Personally I have treated four cases of severe purulent corneal ulceration by vaccines, and the results have been very satisfactory in every

case. The ulceration, as is usual in such infections, did not involve the cornea deeply, but spread principally in the superficial layers of the substantia propria. The infiltration around was not so extensive as that which is present in the pneumococcal forms. The treatment was started from between the third to the sixth day. In two cases the cautery was used in addition to the vaccines, and in two no cauterization was made, the eye being kept clean by boric lotion and atropin instilled. The dose of the vaccine first given was 500 million, from a stock cultivation, and another similar dose was given on the eighth day. Thirty-six hours after the first administration there was no spreading of the ulcer in any of the cases. It is of interest in that one of the cases occurred in a woman who had paralysis of the fifth nerve, so that the cornea was insensitive. The ulcer was caused by an infection following an injury, and although the cornea was insensitive and the ulcer was a severe, purulent one, the progress was entirely stayed after the vaccine was administered, and the ulcer healed in two weeks, in just the same way as if there had been no trophic lesion of the cornea.

Pneumococcal corneal ulceration. This organism is the most frequent cause of the severest type of purulent ulceration of the cornea, as has been pointed out by Th. Axenfeld. The disease is frequently associated with lacrimal obstruction, and the organism is found in the fluid regurgitant from the lacrimal sac. The organism when found is usually not a very virulent one, and is frequently pathogenic only to man. Hence if the organism obtained from the eye is used in making the serum, it probably does not carry with it strong protective properties. For this reason its strength cannot be tested on animals. On the other hand, if the serum is made from a virulent pneumococcus from the lung, it can be standardized in the ordinary way. (See page 685.)

The results of the treatment by serum seem to resemble somewhat the streptococcal serum, in that if the right strains be hit off, a brilliant result may follow. For this reason it seems probable that Römer's serum,²⁵ which is obtained from organisms derived from the eye, is more likely to be successful than a strain derived from pneumonia.

His beneficial results have also been upheld by the following observers: Zur Nedden, Paul, O. Zeller, Mayweg, Sattler,

B. Castresana, Helbronn, A. Vossius, Th. Axenfeld. Personally I have tried three cases with Panne serum,²⁶ which was obtained direct from Naples. It was given hypodermically and dropped into the eye every hour. In two of the cases, which were severe, the ulcer perforated, and in the other, although it eventually healed, it did not seem to influence in any way the effect of the disease.

More recently Wanner sought to improve the results by administering vaccines as well as the serum, the latter presumably with the idea of diminishing the negative phase. Personally one would think that the vaccines would have neutralized the antitoxic effect of the sera.

Keratitis profunda. The presence of toxins in the aqueous undoubtedly causes corneal opacity by the diffusion of the poison into the substantia propria through Descemet's membrane, which is normally impervious to organisms. Syphilis, tubercle and septic infections (especially staphylococcal) of the uveal tract, are the common causes of the disease, and their treatment will be discussed under that heading.

AFFECTIONS OF THE SCLEROTIC.—SCLERITIS.

Endogenous infection of the sclera frequently takes place at the sites where the vessels enter and leave the globe, namely, the neighborhood of the optic disc, and posterior and anterior ciliary arteries, the latter seat being by far the most common. The inflammation starts usually either on its inner or outer surface, probably because the vessels are somewhat constricted as they pass into the denser scleral tissue, the embolism of organisms becoming lodged on the surface of the constriction.

If the inflammation starts on the inner surface of the sclerotic, the ciliary body, and even the iris, cornea (sclerosing keratitis) and choroid are soon involved; in some cases a nodule may appear externally, by the inflammation spreading along the course of the anterior ciliary vessels. The cases which start on the inner surface of the sclerotic so soon give rise to cyclitis that it is generally impossible to tell if the disease has started in the sclerotic or ciliary body, and as the latter is the more important they will be described under uveitis. (See Cases 12 and 14.)

Cases starting on the external surface of the sclerotic give

rise to a localized swelling, soft in consistency, sometimes having a yellow center containing pus. They are frequently so superficial that they can be excised. Indeed, in all the cases recorded below, a piece of tissue was removed for microscopic examination. Although the tubercle bacillus was not found in all the specimens, the histology suggested that this organism was the cause. On the other hand, it has been suggested that similar cases are staphylococcal in origin,²⁷ and again that some of them are the result of ectogenous infection.²⁸ For this reason the cases are given in detail below. Personally I think the balance of evidence is in favor of most of them being tubercular in origin, and this is further upheld by the fact that all my cases yielded to treatment with tuberculin. The notes of the cases are as follows:

Case 1.—J. B., male, age 12 years. Admitted to hospital on April 7, 1906. The patient was a sallow, auburn-haired boy, with enlarged glands in the neck. There was a large warty growth situated immediately below, but not involving, the cornea of the right eye. It was found on operation that the mass had penetrated the whole thickness of the sclera, the ciliary body being seen after its removal. On section, it showed typical giant cell systems with caseating areas, and tubercle bacilli were found in small numbers. The pupils were dilated, and the fundi found to be normal. There was no vitreous trouble. The opsonic index for tubercle bacilli was .5. Tuberculin (1/500th mg.) was given. The wound healed readily, the patient was discharged from the hospital, and remains well at the present time. The scar is firm, although the pigment of the ciliary body can still be seen in it.

Case 2.—C. B., male, age 12 years. Admitted to hospital on May 10, 1906. The patient was a strong, healthy boy. No other tuberculous lesion was found. There was a swelling, situated above the right cornea, which had been noticed one week, but since it was situated under the upper lid, it may have escaped observation for some time. The mass was raised, with ill defined edges, shading off into the surrounding tissue. In the neighborhood the superficial and deep vessels were dilated. The cornea opposite the nodule was opaque, and was invaded by the mass at the limbus. The pupil dilated easily under atropin. The vision was 6/6, and the fundus normal. There were no vitreous opacities.

On August 31st a piece was removed for microscopic examination, and the base cauterized. The microscopic examination was strongly suggestive of tubercle, caseation being found in it, although no tubercle bacilli could be discovered. The opsonic index for tubercle bacilli was 1.0.

On November 2nd, 1/1000th mg. of tuberculin was given. The wound healed readily and cicatrized. The corneal opacity slowly disappeared. At the present time there is only a small nebula remaining in the upper part of the cornea.

Case 3.—C. E., male, age 12 years. Admitted to hospital on September 29, 1906. Strong, healthy boy. No history of syphilis or tubercle. No other tuberculous lesion found, except that there was a suspicion of consolidation in the left lobe of the lung behind. Two years previous to admission the patient had a swelling in the left eye, for which he was treated at a hospital for six weeks. In the right eye there were two distinct nodules in the sclera on the inner side. In the left eye a large nodule in the sclera on the outer side. The corneæ were not involved. Vision was 6/18; fundi normal; vitreous clear. There was a certain amount of photophobia and some pain.

On October 17th a nodule was excised from the right eye, and showed a round cell infiltration with caseation, but no tubercle bacilli were found. The opsonic index was .93, and 1/500th mg. of tuberculin was given, and repeated on November 3rd. Subsequently the nodules rapidly disappeared, and he was discharged on November 14th, the eyes quite quiet, the nodules having entirely disappeared, although the opsonic index had not risen above .4; that is, the patient had not entirely recovered from the negative phase.

The patient remained well until March 15, 1907, when a fresh yellow nodule appeared on the outer side of the right eye, which subsequently invaded the cornea to a slight extent. At this date the opsonic index was .5. The nodules again cleared up after four injections each of 1/500th mg. of tuberculin, and the patient is well at the present date.

Case 4.—A. S., female, aged 26 years. Admitted to hospital on October 24, 1906. There was a very large nodule, with numerous yellowish caseating areas, situated in the sclera of the left eye, close to the limbus. It was diffused one-third round the cornea, but did not involve the latter. The con-

conjunctiva was intact over the surface. The vision and fundi were normal, and there was no vitreous trouble. The patient was placed on antisyphilitic treatment for six weeks without improvement.

On January 4, 1907, the opsonic index for tubercle bacilli was 1.0. A piece of the scleral nodule was removed for microscopic examination, and found to consist of typical tuberculous material (giant cells, epithelioid cells, etc.), but no tubercle bacilli were found. One-five hundredth mg. of tuberculin was given and repeated in two weeks.

On March 29th the large nodule had disappeared, but a small nodule had reformed below, which was subsequently partially removed. The opsonic index at this time was .69. Weekly injections of tuberculin (1/500th mg.) were given. A further nodule again appeared below, but after three more injections, each of 1/500th of tuberculin, at intervals of ten days, the nodules had disappeared and there was only slight injection when last seen, the opsonic index being 1.0.

AFFECTIONS OF THE UVEAL TRACT.

Uveitis. Infection of the uveal tract apart from wounds, which will be treated separately, occurs endogenously, the organism being brought by the blood stream to the part. There is no evidence that the toxin circulating in the blood apart from the organism can set up inflammation in the uveal tract. Uveitis is usually divided into suppurative and nonsuppurative.

Suppurative uveitis, apart from small hypopyons, usually ends in rapid destruction of the eye, either terminating in panophthalmitis or a condition of pseudoglioma. The latter condition is really intraocular suppuration, the pus from which does not rupture externally. It is most commonly associated with postbasal meningitis, and the organism, the diplococcus intracellularis meningitidis, which is carried to the eye by the blood stream,²⁹ can be found in the pus if it be examined in the early stages. Meningococcal serum is used in the treatment of the disease, and in one case of pseudoglioma, in which the organism was found in the cerebrospinal fluid, and treated with serum injected into the spinal canal, it had no beneficial effect on the eye, which subsequently had to be removed when the patient recovered.

Acute nonsuppurative uveitis. I have had the opportunity of treating only one acute case of septic origin with staphylococcal vaccine in which recovery took place:

A man, age 40 years, who was suffering from boils on the neck due to the staphylococcus aureus, was seized with intense pain in the left eye. Two days later the eyelid and conjunctiva were swollen, the iris was greenish in color, and there was a small hypopyon. Through the pupil, which was semidilated with atropin, could be seen a mass of yellowish lymph lying below on the surface of the ciliary body. A cultivation was taken from the boils, which proved to be the staphylococcus aureus. An injection of 500 million of staphylococcus aureus was given. A week later the eye had become much quieter, there was no pain, the exudate had diminished in amount, and the hypopyon had gone. On the tenth day a further dose of vaccine was given. At the end of three weeks the eye was nearly white, the iris was discolored, and there was some keratitis punctata present. The exudate on the surface of the ciliary body disappeared and the fundus reflex was more marked, although no details could be seen. A third dose of vaccine was given at the end of the fourth week. At the end of six weeks the patient could count fingers, the keratitis punctata had disappeared, but no fine detail of the fundus could be seen, although the position of the disc could be made out. The boils on the neck had cleared up entirely.

Similar cases, in which the eye was removed, have been recorded by Axenfeld, in which there was discovered a plug of staphylococcus in one of the ciliary vessels. How far the vaccine benefited this case it is impossible to say. The rapid subsidence of the inflammation after its use is suggestive that it was of service; at any rate, it is worth further trial in these rare cases.

Gonorrheal rheumatic iritis. The disease is a serous iritis, the main feature of which is its great liability to recurrence. The attacks are of variable severity and do not usually last for more than two or three weeks, so that it is obvious that the object of the treatment by sera and vaccines is rather to prevent its recurrence than to diminish the severity of the attack from which the patient is suffering. Sufficient time and trial has not been given to say whether the treatment of

gonorrheal rheumatic iritis by sera and vaccines has much effect on preventing these recurrences. It has been pointed out that the immunity produced by the gonococcal serum is not very effective, as it has to be prepared from an animal not susceptible to the gonococcus. Personally I have seen it used in two cases with little or no effect on the disease, although Knapp³⁰ quotes three cases, in two of which he is sure the serum did good.

Vaccine treatment has been more extensively employed, and a number of cases have been reported by Posey, McKee, Oliver and Weeks,³¹ in which apparently immediate benefit was derived from the treatment. Personally I have seen one case in which there was no recurrence for a year after the administration of the vaccine, although the patient had had several attacks during the previous year; and one case in which vaccine was administered for gonorrheal rheumatism, but in spite of this an attack of iritis developed three weeks after the third inoculation. But as yet the evidence on these points is still *sub judice*, the proof of its efficiency depending more on its power of preventing recurrences than diminishing the period of the attack, as the length of the latter varies considerably. The dose of vaccine given was from 25 to 50 million organisms. (See page 689.)

Chronic nonsuppurative uveitis of endogenous origin. Before passing directly to its treatment by vaccines, I wish to show points in theory on which its treatment is based. There are many deficiencies in proof of some of the suggestions put forward in this essay, and if some of the statements appear dogmatic, I would plead in excuse that it is with the idea of raising points for further investigation.

It is only within the last few years that any attempt has been made to arrive at a scientific diagnosis of the cause of chronic uveitis. Indeed, before this time syphilis, and occasionally tubercle, were the ascribed causes, and such cases were treated empirically on their clinical manifestations. I hope to be able to show that some pyogenic organisms may also cause a nonsuppurative inflammation of the uveal tract, and can be obtained in the aqueous in those cases. A number of biochemic and tissue reactions have been comparatively recently introduced, which assist in the diagnosis. The use of vaccines associated with repeated paracentesis have, I think,

made an advance in the treatment of this most intractable disease.

The nature of the infection. Although it is possible that many organisms may be the cause of chronic uveitis, as far as my investigations go there seem to be three chief causes, namely, infection by the tubercle bacillus, staphylococcus, and the spirocheta pallida. Out of thirty cases in which there was good evidence of the cause, fifteen were tuberculous, ten staphylococcal, and five syphilitic.

The organisms causing the uveitis have all been demonstrated in the aqueous by different observers.

Apart from external wounds in the globe, infection of the uveal tract must take place via the blood stream, and it necessarily follows that there must be some focus of infection elsewhere in the body from which the ocular affection arises.

In the tuberculous cases under my care the primary foci were most frequently either in the lung, glands in the neck, or mediastinum. In all the cases there was little evidence of activity in these lesions, which in nearly every instance was a small one.

The staphylococcal lesions which gave rise to ocular affections were usually chronic ones, such as pyorrhea alveolaris, boils, and leucorrhea. In a few cases no primary lesion could be found, and in these cases the intestinal tract may have been the source of the infection, or, as is more probable, the original lesion had disappeared, leaving only the ocular manifestations.

Chronic middle ear disease has been recorded in some instances, but the latter more usually gives rise to a suppurative inflammation, for the reason I shall point out. Although the staphylococcal form of the disease is really of the nature of a very chronic pyemia, as yet no attempts have been made to demonstrate the organisms in the blood; although the organism has been found in the blood of patients suffering from the associated lesions, such as boils, pyorrhea alveolaris, which probably accounts for the toxemic cachexia which so frequently accompanies these diseases.

All my cases of septic origin occurred in females. Whether this is merely coincidence I am not prepared to state, but I think the disease is more prevalent in women.

The probable reason why the primary lesion is of a sup-

purative nature and the cyclitis nonsuppurative, is that the organisms become decreased in virulence from their contact with the blood serum, and also the fact that the organisms are probably free in the blood and are not contained in an embolism or blood clot, and therefore only comparatively few lodge in any individual part of the uveal tract. In contradistinction to this is the cyclitis associated with mastoid supuration, which is always suppurative; the jugular vein being plugged by a mass of infected blood clot, a portion is carried to the eye by the blood stream, and there forms a local focus containing a large number of virulent organisms which have not first come in direct contact with the blood serum.

Endogenous infections of the more chronic type, involving the uveal tract, more especially tubercle, frequently affect both eyes. This seems to be due to the selective action of bacteria to grow more readily on the same soil as that on which they were originally cultivated. Thus, in the case of the tubercle bacillus, it is well known that it will pick out all the joints of the body; so in the same way it may affect both eyes. If, therefore, an eye has become disorganized by tubercle, it ought to be removed, as it is a danger to the other eye. Going a step further, if we regard sympathetic cyclitis as being due to a septic infection of the exciting eye, it may be inferred that a chronic pyemia is set up which causes an infection of the other eye through the blood stream without producing other infective lesions, as the organism has no suitable soil on which to grow.

The manifestations. I do not propose to go into the clinical and histologic changes in cyclitis, which are so well known, but rather to touch a few special points which are of assistance in making a diagnosis.

Keratitis punctata consists of the round cell exudation which accompanies all chronic inflammation, being deposited on the back of the cornea. It may be derived from any part of the uveal tract, even from lesion of the choroid near the posterior pole of the globe, the cells making their way forward through the vitreous and suspensory ligament into the anterior chamber. The size of the deposits varies somewhat with the variety of the infection.

In staphylococcal and syphilitic cases it usually consists of a cloud of fine dots, which may cover the whole of the back

of the cornea, whilst in tubercle the cells tend to collect in large masses, which are known as "mutton fat K. P." This does not depend on the amount of exudate, since it may be greater in staphylococcal lesions, but I think is probably due to the agglutination of the cells, owing to variety of agglutinin body present in the aqueous.

Interstitial keratitis. All forms of cyclitis, especially in their subacute stage, may be accompanied by an opacity in the deeper layers of the cornea. In tuberculous cyclitis the opacity consists of localized nodules of round celled infiltration in the deeper layers of the cornea. In syphilis an interstitial keratitis may result. In staphylococcal cyclitis a condition known as keratitis profunda may arise; in the latter condition the round cell infiltration is not so large in amount, but more fluid is effused, often giving rise to wrinkling of Descemet's membrane. Descemet's membrane being impervious to organisms, it is probable, at any rate in the early stages, that the corneal infiltration is due to the diffusion of the toxins in the aqueous into it; in the case of syphilis this has been proved by the injection of an emulsion from a primary chancre into the anterior chamber, which causes an interstitial opacity; in the case of tubercle, and probably also of syphilis, secondary invasion by the organism may take place from the limbus.

The changes in the iris are essentially those of atrophy following the vascular sclerosis secondary to the inflammation. There is discoloration, due to the loss of pigment of the stroma; this I have been able to verify in a piece of iris removed by iridectomy in a case in which extraction of a cataract was performed. In two cases of subacute cyclitis with a quantity of fine K. P. and keratitis profunda, in which the staphylococcus was found in the aqueous, localized patches of complete atrophy took place in the iris stroma, near its root. It is possible that these may have been the seat of the infection.

The cause of the lenticular opacity, as has been pointed out by Mr. E. T. Collins, is probably due to the action of the toxin on the cells lining the lens capsule, causing their death, which allows osmosis of the aqueous to take place into the lens, so that it becomes opaque.

The manifestations in the choroid are of two types: They

may be entirely limited to the anterior part of the choroid, and are then due to the direct spread of the disease backwards from the ciliary body; or isolated patches may occur near the disc, which must be regarded as separate foci of the disease. The latter are of interest in that they may be of help in the diagnosis. Taken as a general rule, there is less pigmentation in the tuberculous form than in the syphilitic or septic forms.

In two cases where the staphylococcus was found in the aqueous, in one of which the Wassermann reaction was tried and found negative, there was intense pigmentation in the fundus, similar to that found in syphilitic cases, except that the patches were localized and not scattered all over the fundus, as is more common in the latter disease.

Two cases of tuberculous origin, and one of staphylococcal, in which nodules were present in the choroid near the disc, and which were under observation for two, three, and five years, exhibited from time to time a change which is probably more frequent than is usually recognized. The patches, after they had become quiescent from the original attack, showed an atrophy of the choriocapillaris, allowing the large vessels in the choroid to be easily seen; their visual acuity was normal. These patients were subject to attacks of misty vision, and, when examined, the patches were seen as white areas, probably due to subretinal edema. When this disappeared the vision became restored. One of these patients had as many as ten attacks, but the size of the atrophic patch did not increase or the vision diminish. Presumably this edematous change was due to some local vascular sclerosis following the inflammation, rather than a recrudescence of the disease.

THE VARIATIONS IN THE TENSION OF THE EYE.

There is little doubt that in some cases the albuminous nature of the aqueous inhibits its filtration from the angle of the anterior chamber, and this becomes deepened and the tension raised. But in some cases, especially in sympathetic cyclitis, the anterior chamber is shallow, and the angle of the chamber occluded. In these cases the alteration in the vitreous seems to play an important part. As a general rule, eyes submitted to histologic examination are fixed in formalin, which does not coagulate the vitreous. Recently I have been fixing eyes,

where it was desired to examine the vitreous, by boiling, which coagulates the vitreous. In two exciting eyes of sympathetic cyclitis, in which the tension was raised, the vitreous was found to consist of a dense albuminous coagulum. Probably as a result of the alteration in the osmosis through the hyaloid membrane, and the increased absorption of water by the albuminous vitreous, the lens and iris had been pushed forward, the latter blocking the angle of the anterior chamber.

Atrophy of the ciliary body has always seemed an inadequate explanation of the diminution of tension in the eye. I have had the opportunity of examining only one case of very chronic tuberculous cyclitis, in which the tension of the eye was low and yet the eye not disorganized. In this case, although the retina was for the most part in its normal position, the hyaloid had shrunk into a clear membrane behind the lens; the vitreous having been absorbed, the space between the hyaloid and the retina was occupied by a clear comparatively nonalbuminous fluid. It may prove on further investigation that in many instances the so-called fluid vitreous, which so frequently accompanies these cases, may not be vitreous at all, but merely fluid between the shrunk vitreous and retina. It is easy to see that the tension in such an eye can be readily disturbed, and is dependent on whether more or less fluid is absorbed by the retinal lymphatics, and be the cause of retinal detachment which often takes place.

THE MEANS OF DIAGNOSIS.

The clinical appearance of the eye is of extreme importance in making the diagnosis. In tubercle, the mutton fat K. P. and the presence of nodules on the iris, perhaps associated with tuberculous lesions elsewhere, is almost diagnostic. On the other hand, where the cornea is covered with fine K. P., with, perhaps, some deep infiltration of the cornea (*keratitis profunda*), associated with *pyorrhea alveolaris*, a staphylococcal lesion must be suspected. Iritic adhesions may be present in all forms of the disease, although they seem less common in the staphylococcal form.

Vitreous opacity is not nearly so dense in the tuberculous form, and may be absent. It is always present in the syphilitic and staphylococcal forms of the disease, especially in the latter. There are a number of cases of cyclitis where, when they

present themselves for examination, it is impossible to say from the clinical appearance whether the infection be tuberculous, septic, or syphilitic in origin. In these cases reliance must be placed on various tests.

The first group of these is to determine the presence of the organism within the body. The value of these is principally by a negative reaction to exclude the disease. Thus, von Pirquet's reaction for tubercle is given so frequently in apparently healthy people as to make its utility doubtful. Since its introduction this reaction was tried in most of my cases, but two of the cases which yielded this reaction proved subsequently to be staphylococcal in origin.

The Wassermann reaction has only comparatively recently been introduced, and as yet personally I have not had sufficient experience to justify any statement as to its value in the diagnosis of syphilis in cyclitis. I have used it in the later cases to exclude syphilis. The early cases were first submitted to a course of iodid, with the idea of excluding this disease. The local reaction of the eye following the injection of the toxin into the blood is a most valuable means of diagnosis. The reaction usually shows itself about forty-eight hours after inoculation by increased ciliary injection, K. P., and vitreous opacity. These generally render themselves obvious to the patient by a slight impairment of vision. If active choroidal mischief is present in the fundus, the patches show increased edema. These changes are usually produced after the first injection, if the dose given be sufficiently large, but occasionally they do not make their appearance till the second injection. The dose required to produce the reaction is nearly a full one. Such is administered in treatment—for example, tuberculin T. R., 1/1000 mg.; staphylococcus, 1000 millions.

The bacteriologic examination of the aqueous is the only means by which absolute proof of the nature of the organisms can be obtained. Probably owing to the scarcity of the organisms, personally I have never been able to find organisms in smear preparations of the aqueous, even after centrifugalization, although cases have been reported in which the tubercle bacillus has been found. The inoculation of the aqueous into animals from a case of tuberculous cyclitis has been followed by positive results. The aqueous in tuberculous

cases will also yield the Bordet reaction. In septic cases the method which I have adopted is to inoculate the aqueous onto agar or blood serum. It is obvious that the question of contamination from the conjunctiva must be excluded.

The method adopted in the early cases was, after carefully cleansing the conjunctival sac by frequently irrigating it for three days, to tap the anterior chamber with a keratome, and as the fluid escaped over its surface it was drawn into a sterile capillary pipette and the media inoculated therefrom. Although the risk of contamination is extremely small, to exclude all possibility of outside contamination in three cases, a hollow needle with a spearlike point, as has been suggested by Mr. Bishop Harman, was used, the point of entry being first touched with the cautery. The fluid was withdrawn into a sterile syringe and inoculated onto the media. In all these cases the staphylococcus albus grew on the media, and in one instance as many as twenty colonies were present, although, as a rule, there are not more than three or four. I do not adopt this method as a routine, as it is more dangerous than simple paracentesis; indeed, if the needle is not very sharp, and the blade sufficiently broad to make an incision large enough to admit the shaft, great difficulty may be met with in its introduction, although personally I have had no accidents.

TREATMENT BY REPEATED PARACENTESIS AND THE ADMINISTRATION OF VACCINES.

The routine which I generally adopt on seeing a patient with cyclitis of doubtful origin is to do a Wassermann reaction to exclude syphilis. von Pirquet's reaction is then performed, and if negative the anterior chamber is tapped and cultivation made. If the staphylococcus is found, a vaccine is made and administered. If von Pirquet's reaction is positive, a dose of tuberculin is given and the local reaction watched for.

Tubercle. Mr. Hancock and myself in 1908 published a series of tuberculous cases, both of scleritis and cyclitis, treated by tuberculin T. R., and the beneficial results obtained by it. In the early cases the opsonic index was carefully watched, but I think it is unnecessary, since the local reaction in the eye gives a more accurate guide to the effect of its administration and the dose can so be regulated. In patients who had no extensive tuberculous lesions elsewhere, 1/1000

mg. was first administered, and this gradually increased up to 1/250. In patients who had other extensive tuberculous lesions 1/5000 was administered, and this often cannot be increased, as the local reaction produced is severe, probably owing to autoinoculation. The vaccine is administered by hypodermic injection into the arm.

Of fifteen cases so treated, in twelve the eye or eyes became quiescent, the K. P. disappeared. As some of the cases were more advanced than others, the amount of vision regained depended on the stage of the disease in which the patient sought treatment. In one of the cases, in which both eyes were affected, the disorganized eye was removed and the diagnosis confirmed.

Three of the cases were not benefited by the treatment, although one showed an improvement for a short time. One of these was in a patient with buphthalmos, and another in a very debilitated woman. One child subsequently developed other multiple tuberculous lesions, but not till eighteen months after the eye had become quiescent and tuberculin treatment had been stopped.

These results are upheld by Derby.³² In thirty cases of tuberculous infection of the uveal tract improvement was noted.

Staphylococcal. The rationale of treating localized septic inflammatory conditions elsewhere in the body is to evacuate their contents, thereby getting rid of the organisms, toxins, etc., and also to allow the site of the lesion to be flooded with blood serum containing protective bodies. In treating cyclitis of septic origin, I have tried to adopt these principally by performing repeated paracentesis of the anterior chamber, and combining it with the administration of vaccine, so as to raise the amount of protective bodies in the blood serum. After evacuation of the anterior chamber these bodies are found in the aqueous. An initial paracentesis is performed to obtain the organism with which to make the vaccine which is administered. Ten days later, when the opsonic index is at its height, another paracentesis is performed, which can be repeated after subsequent inoculation, if desired. In 1908 I published a series of cases so treated. The good results have been fully maintained. Out of ten cases, in six the K. P. cleared entirely, although in most a few vitreous opacities

remained. In two cases one eye cleared, whilst in the other K. P. is still present, although the eye shows a marked improvement. In two cases a marked improvement as regards vision occurred, although the K. P. was still present when last seen. The cases seen in the early or subacute stages yield more readily to treatment, although in one case, in which the disease had existed for over two years, and the vision was reduced to 6/60, it improved to 6/6 in eight weeks. Old standing cases, with marked heterochromia, deep anterior chambers, and commencing lenticular opacities, improved very slightly under treatment. The K. P. occasionally disappears soon after the paracentesis, but may reform. Wrinkling of Descemet's membrane and slight infiltration of the deeper layers of the cornea may occur after the operation, but subsequently disappear.

In most of the cases a vaccine was prepared from the eye, but in some instances a mixed staphylococcal vaccine was used. Although the latter was efficient, the former is more satisfactory; indeed, in one case in which the mixed vaccine was tried and was unsuccessful, improvement took place when the patient's own organisms were administered. To summarize the result of the treatment, I should say the method is a distinct advance in treatment, as yet far from perfect; that most of the cases are much benefited by the treatment, and occasionally brilliant results are obtained. The following is the summary of the cases:

TUBERCULAR CASES.

Name.	Sex.	Age.	Primary or Other Foci.	Condition of the Eye Affected.	General Reaction.	Local Reaction and Bacteriologic Examination of the Aqueous.	Treatment.	Duration of Treatment.	Result of Treatment.
1. C. B.	F.	12	Signs of thickened pleura and dullness on apex of the lung.	Left eye only affected. Fine K. P. with slight corneal haze. Vision 6/9. Vitreous opacities.	Von Pirquet positive.	Local reaction to tuberculin.	Tuberculin T. R. given in doses of from 1/2000-1/500; 5 doses were administered.	8 wks.	Left eye cleared entirely. Vision 6/5. No K. P. No recurrence after three months.
2. A. G.	F.	17	No other signs of tubercle.	Commenced as double serous iritis. Nodules subsequently appeared in left eye. V. R. 6/36. V. L. 16.	Opsonic index .5.	In commencement of treatment local reaction to tuberculin.	Tuberculin T. R. given in doses of from 1/1000-1/750.	6 mos.	Left eye cleared up entirely. Right, iridectomy had to be performed for tension. Nodules had disappeared. Eye quieted down. When last seen a few spots of K. P. still present in right eye.
3. A. G.	F.	42	Two sisters died of phthisis. No other tuberculous lesion.	V. R. 6/6. L. perception of light. T. + 1. Three large nodules on periphery of iris. Mutton fat K. P. Lymph on capsule.	Opsonic index .96.	Marked local reaction to tuberculin.	Tuberculin T. R. given in doses of from 1/1000-1/500.	8 mos.	Nodules disappeared in three weeks. Improvement took place for a time, but subsequently the cornea became infected from the conjunctiva and a corneal ulcer formed, the eye being subsequently enucleated.

4.	S. O.	F. 27	Very thin, with a cough. No other signs of tuberculous disease found.	Both eyes were affected. Nodules on both irides. Mutton fat K. P. T. + 1 in both.	Opsonic index 1.4.	Well marked local reaction to tuberculin.	Tuberculin T. R. given in doses of from 1/1000-1/500.	4 yrs.	Condition much improved for first six months. Nodules disappeared, but subsequently returned from time to time. Although more or less stationary, the eyes are tending to become worse and disorganized, though patient can still find her way about.
5.	B. F.	F. 17	Signs of phthisis right apex.	Both eyes affected six weeks. Mutton fat K. P. with posterior synechiae.	Opsonic index 1.	Local reaction to tuberculin.	Tuberculin T. R. given in doses of from 1/1000-1/500.		K. P. disappeared entirely. Eyes became quiet and posterior synechiae broke down under atropin.
6.	W. N.	M. 3	Probably primary infection through wound of the cornea.	Left corneal ulcer followed in 3 weeks by nodules all over surface of the iris with mutton fat K. P.	Opsonic index .81.	Well marked local reaction to tuberculin.	Tuberculin T. R. given in doses of from 1/1000-1/500.	3 mos.	Nodules disappeared in four weeks. Patient finally discharged with no K. P. Eye quiet. Slight corneal nebula.
7.	A. C.	M. 14	Source of infection tubercular glands in the neck. Strong family history of phthisis. Patient has buphthalmos.	Pine K. P. No vitreous opacities.	Von Pirquet positive.	Local reaction to tuberculin.	Tuberculin T. R. given in doses of from 1/1000-1/250.	12 mos.	Boy remains in statu quo. No alteration in his condition except that the anterior chamber has become deeper. Vision still remains 6/6 in both eyes.

TUBERCULAR CASES—(Continued).

Name.	Sex.	Age.	Primary or Other Foci.	Condition of the Eye Affected.	General Reaction.	Local Reaction and Bacteriologic Examination of the Aqueous.	Treatment.	Duration of Treatment.	Result of Treatment.
8. G. W.	M.	5	Source of infection was tubercular glands in the neck.	Large nodules on the iris. Shown at the Ophthalmological Society in 1909. Iris much discolored.	Von Pirquet positive.	Local reaction to tuberculin.	Tuberculin T. R. given in doses of from 1/2000 to 1/1000.	6 mos.	Nodules had disappeared in four weeks. No K. P. after three months' treatment and eyes quiet. Iris bound down to an opaque lens. Iridectomy was subsequently performed without lighting up the inflammation. After eighteen months, from cessation of treatment, child developed other tubercular foci in the mediastinum.
9. E. B.	F.	32	Doubtful phthisis.	Nodules in the left choroid near the macula. K. P. No other signs of cyclitis. V. 6/60.	Von Pirquet positive.	Local reaction to tuberculin.	Tuberculin T. R.	5 yrs.	After four weeks patient had recovered vision to 6/6. No K. P. Subsequently had ten recurrent attacks of edema in the choroidal patch, causing loss of vision, and after each attack the vision recovered to 6/6 and the disease had not spread.

10.	G. S.	M.	23	No other signs of tubercle.	Treated elsewhere previously two years. Left eye had mutton fat K. P. No nodules on the iris. Few vitreous opacities.	Von Pirquet positive.	Local reaction to tuberculin marked.	Tuberculin T. R. given in doses of from 1/1000-1/500.	2 yrs.	The right eye remained in statu quo; the left improved for a time, though slight K. P. still present. During this time vision had not deteriorated.
11.	C. C.	F.	35	One brother died of phthisis. No other signs of phthisis except that patient had a cough in the winter.	Rt., V. 6/18; Lt., fingers. Well marked mutton fat K. P. in both. Corneal opacities in the left.	Von Pirquet positive.	Marked local reaction to tuberculin.	Tuberculin T. R.	3 mos.	Right, vision 6/9. K. P. disappeared. Left eye much improved. Pupil dilated. Slight K. P. Still under treatment.
12.	J. P.	F.	23	Three near relatives died of phthisis. Patient very thin. Said to have phthisis.	Lt., vision hand movements. Posterior synechia. Mutton fat K. P. Ciliary injection. Iris commencing to be bombé. Nodule in the sclera.	Von Pirquet positive.	Marked local reaction to tuberculin.	Tuberculin T. R.	5 mos.	Injection gone. No K. P. Swelling of ciliary region gone. Vision 6/24. Iris bombé subsided, but the pupil is still almost excluded. Eye quiet. Six months, no return.
13.	F. F.	F.	47	Four near relatives died of phthisis. Patient is thin and has a cough. No physical signs.	Lt. eye, nodules on the iris. Posterior synechia. Mutton fat K. P. Rt. eye, large pigmented mass in choroid in macular region. No K. P. Vitreous opacities in both eyes.	Von Pirquet positive.	Local reaction to tuberculin in both eyes.	Tuberculin T. R. given in doses of from 1/1000-1/500.	8 wks.	Nodules disappeared in three weeks. K. P. has all disappeared except for one spot in the right eye. Still under treatment. K. P. now entirely gone (March 3, 1911).

TUBERCULAR CASES — (Continued).

Name.	Sex.	Age.	Primary or Other Foci.	Condition of the Eye Affected.	General Reaction.	Local Reaction and Bacteriologic Examination of the Aqueous.	Treatment.	Duration of Treatment.	Result of Treatment.
E. B.	F.	43	Phthisis right apex. Four near relatives died of phthisis.	Nodules in both sclera with sclerosing corneal opacity, cyclitis, and mutton fat K. P. V. 6/60 in both.	Von Pirquet positive.	Local reaction to tuberculin on second injection.	Tuberculin T. R. given in doses of from 1/1000-1/250.	10 wks.	Scleral nodules cleared entirely. No adhesions. K. P. disappeared. Vision, Right, 6/5; Left, 6/6.
C.	F.	40	Phthisis.	Lt. eye bad 14 years. Had glaucoma; now keratitis, cyclitis. T. + 1. This eye was subsequently enucleated and found tuberculous. Rt. eye became bad six years ago. Serious cyclitis. K. P. Patch of choroiditis on the outer side. Vitreous opacities. No K. P. at present. Vision 6/9.	Von Pirquet positive.	Marked local reaction in the choroid after injection of tuberculin.	Tuberculin T. R.	6 mos.	Had repeated attacks of misty vision, which improved with tuberculin. Vision now 6/6.
A. S.	F.	20	No signs of tubercular lesions. One aunt died of phthisis.	Both eyes affected. K. P. well marked in both.	Von Pirquet positive.	Marked local reaction after tuberculin.	Tuberculin T. R.	14 mos.	K. P. entirely gone. Vision, Right, 6/6. No vitreous opacity.

STAPHYLOCOCCAL CASES.

Name.	Sex.	Age.	Primary or Other Foci.	Condition of the Eye Affected.	General Reaction.	Local Reaction and Bacteriologic Examination of the Aqueous.	Treatment.	Duration of Treatment.	Result of Treatment.
1. A. L. P.	F.	25	Teeth.	V., Rt. shadows. K. P. all over back of cornea. T. + 1. Keratitis profunda.		Local reaction to staphylococcus vaccine. Anterior chamber tapped; staphylococcus found on two separate occasions.	Treated by vaccines made from her own organisms.	6 wks.	Vision, Right, 6/6. No K. P. Atrophic patch upwards and outwards left in the iris.
2. L. L.	F.	27	Teeth.	Vision 6/9. Marked K. P. No synechia.		Local reaction to staphylococcal injections. Anterior chamber tapped; staphylococcus found in the aqueous.	2 to 8 million from own vaccine.	3 mos.	Vision, 6/6. No K. P. Still slight vitreous opacities.
3. K. E.	F.	23	Teeth.	Vision, Rt. 6/24; Lt. counts fingers. K. P. Vitreous opacities. No posterior synechia. Keratitis profunda.		Local reaction to staphylococcal injection.	2 to 8 million given.	6 wks.	Much improved. Did not attend again.

STAPHYLOCOCCAL CASES—(Continued).

Name.	Sex.	Age.	Primary or Other Foci.	Condition of the Eye Affected.	General Reaction.	Local Reaction and Bacteriologic Examination of the Aqueous.	Treatment.	Duration of Treatment.	Result of Treatment.
d. K. F.	F.	54	Teeth.	Rt., extensive pigmented choroiditis; Lt., K. P. Has had K. P. and cyclitis in this eye before attending. Iridocyclitis. Dense vitreous opacities.		Marked local reaction to staphylococcal injections. Anterior chamber tapped; staphylococcus found in the aqueous.	2 to 8 million given.	3 mos.	K. P. has almost gone from the left eye. Cornea is clear. Right remains in statu quo except for attacks of mistiness of vision at times.
e. G. G.	F.	30	Teeth.	Said to be of 6 weeks' duration. Fine K. P. in both eyes. Left iris discolored. Posterior polar lens opacity.		Local reaction to staphylococcal injections.	Mixed staphylococcal vaccine.	6 mos.	K. P. disappeared after six weeks in the right eye. Left eye not improved.
f. E. E.	F.	48	Bad teeth. Came on during lactation.	Lt. eye marked K. P. Posterior synchia; T. + 1.		Anterior chamber tapped; staphylococcus found.	Staphylococcal vaccine.	4 wks.	Pupil dilated. Eye quiet. K. P. nearly gone except for a few spots of pigmentation.

7.	D.	F. 30	Teeth. Abscessed roots.	Attack came on suddenly after extraction of teeth. Lt., fine K. P. Vision, 6/24. Large patch of choroiditis in the fundus near the macula. Duration 5 weeks. Vitreous opacity. No adhesions.	Local reaction to staphylococcal injections.	2 to 10 million given.	6 wks.	Vision recovered in three weeks to 6/6. In four weeks K. P. had disappeared. Eye was then quiet for six months, when the vision dropped to 6/8, due to edema in old patch of choroiditis in the macula. This subsequently recovered to 6/6.
8.	E. B.	F. 40	Boils after confinement.	Duration one year. V. 6/60. No adhesions. Fine K. P. all over back of cornea. Vitreous opacity.	Opsonic index .75.	5 to 10 million mixed staphylococcal injections given.	5 mos.	Eyes cleared up entirely after six months. Vision 6/6. No K. P. and few vitreous opacities.
9.	G. B.	F. 26	Teeth.	V. 6/12. Deep anterior chamber.		Anterior chamber tapped.	4 wks.	K. P. less. Few pigment spots only. Vision 6/9. Still under treatment.
10.	F. 12.	F. 21	Teeth.	Lt., fingers.		Anterior chamber tapped; proper colonies of staphylococcus on culture.	4 wks.	K. P. gone. No injection. Pupil dilated.

SYPHILITIC CASES.

Name.	Sex.	Age.	Primary or Other Foci.	Condition of the Eye Affected.	General Reaction.	Local Reaction and Bacteriologic Examination of the Aqueous.	Treatment.	Duration of Treatment.	Result of Treatment.
L. L.	F.	49	Doubtful syphilitic history.	Lt., old posterior synechia. Swelling on outer side. Marked K. P.	Von Pirquet negative.		Cleared up entirely under Pot. iod.		
A. C.	M.	52	Specific history.	Posterior synechia. K. P.			Cleared up entirely under Pot. iod.		
E. S.	M.	44	Syphilis 20 years ago.	Rt., posterior synechia. K. P. T. + 1. V. 3/60.	Wassermann positive.	Anterior chamber tapped. Nothing found in aqueous.	Cleared up under Pot. iod.		Few posterior synechia. Vision 6/6.
G. C.	M.	27	Syphilis 10 years ago.	K. P. and vitreous opacities in both. No adhesions. V. 6/18.			Cleared up under Pot. iod.		Vision 6/9, right and left. Few vitreous opacities remaining.
C. B.	F.	31	Syphilitic history.	Lt., K. P. Vitreous clear. Few posterior synechia. V. 6/18.			Cleared up under Pot. iod.	12 mos.	Vision 6/6.

AFFECTIONS OF THE CHOROID.

Choroiditis may occur in association with lesions in the anterior portion of the uveal tract. Three cases have already been described, associated with iridocyclitis, in which the choroidal lesion improved under treatment with vaccine. (See cases 13 and 15, tubercle; and case 4, staphylococcal.)

In solitary lesions of the choroid the chief difficulty is in making a diagnosis of their nature. They may be due to either tubercle, sepsis, or syphilis, the former probably being the most frequent. Occasionally, as in case 15 (tubercle), one may show a lesion in the anterior portion of the uveal tract, whilst the other may have a lesion in the choroid only; but usually the diagnosis has to be made on the clinical appearance of the nodule and its local reaction after the administration of the vaccine. In two tuberculous cases which I have observed, the reaction to the tuberculin was shown by increased swelling and blurring of the outline of the mass in the choroid, and in one instance by small hemorrhages into the retina over it, which occurred forty-eight hours after its administration. In the first case the disease became quiescent under the treatment. In the second, the patient, after being under observation for three months, in which time the disease gradually increased, had a large hemorrhage into the vitreous, which at the present time has not cleared sufficiently to see the condition of her fundus.

Solitary patches of choroiditis associated with staphylococcal lesions (pyorrhea alveolaris, boils; see cases 7 and 8) yielded readily to treatment with staphylococcal vaccine. In case 8, after all treatment had been tried, the patient being in good circumstances, the disease yielded almost at once to the treatment. In case 7 the association of the attack with the extraction of a tooth with an abscess at its root made the diagnosis almost certain.

WOUND INFECTION.

Wounds of the globe are the result of accident or operation. Accidental wounds may be infected by organisms carried in on the foreign body causing the injury, or by organisms derived from the conjunctival sac. The organism which is most frequently found in such infections is the staphylococcus. Thus, I found this organism in five out of six cases of

panophthalmitis due to injury, but other organisms, such as the streptococcus, pneumococcus and bacillus capsulatus, do also occur. Unfortunately in most instances accidental wounds which are infected usually terminate in panophthalmitis, and such acute affections are not remediable by sera or vaccines.

OPERATION WOUNDS.

I have shown elsewhere that the ophthalmic surgeon is always operating in an infected area, the conjunctival sac being never sterile,³³ although the number of organisms can be reduced by proper precautions taken before operation. Further, the virulence and nature of the organism and position of the wound are important factors in determining the severity of the inflammation. It is of great importance that the organisms present in the conjunctival sac should be examined before intraocular operations are performed. The organism which I have most frequently found, both in the conjunctival sac and in eyes the subject of inflammation after operation, is the staphylococcus. More rarely in severe inflammation the pneumococcus is sometimes found. If the latter organism is found in the conjunctival sac, no operation ought to be performed until it is got rid of by treatment. The staphylococcus, although almost always present, can be much diminished in numbers by constantly cleansing out the sac with antiseptic lotions for a few days before operation.

Occasionally one comes across cases in which it seems impossible to get rid of this organism, especially when it is associated with the Morax-Axenfeld bacillus, giving rise to chronic conjunctivitis. In these cases it is most desirable to produce an artificial immunity by the administration of vaccines before operation. In two cases of cataract, in which in spite of treatment for six weeks this organism could be found in large numbers in the conjunctival sac, artificial immunity was produced by mixed vaccines, and extraction was performed without any inflammatory symptoms supervening.

In one case of mixed staphylococcal and pneumococcal infection in the case of subacute glaucoma, a mixed vaccine was administered two days before operation and no inflammatory symptoms supervened.

The prophylactic use of vaccines and sera has been exten-

sively employed by continental surgeons with good results, and undoubtedly should be more used in this country than they are at present, especially in cases in which the conjunctiva is the subject of chronic inflammation.

AFTER OPERATION.

Two clinical forms of wound infection are recognized: (1) Suppurative, and (2) nonsuppurative.

1. Suppurative. It is obvious that in panophthalmitis it is useless to use immunizing agents to save the eye. If the orbit becomes infected, sera, such as streptococcal, pneumococcal, tetanus, etc., may be used, depending on the organism which is found on examination, with the hope of preventing general infection or the spread of the inflammation backwards to the meninges.

Occasionally after sections into the eye, especially after cataract extraction, the suppuration may be confined more or less to the wound, the whole line of the wound becoming purulent without actual panophthalmitis taking place. In two such cases which I have examined, both were due to the staphylococcus albus. One case was treated by a vaccine and the other was treated by constant cleansing with boracic lotion and hot fomentations. Although the case treated by vaccine was the more severe and occurred in a frail old woman of 89 years, the final result was far better than the other, which I think can be attributed only to its use.

The following is an abstract of the notes of the case: Female, aged 89. Ordinary straightforward cataract extraction with an iridectomy three days previously. Along the line of the wound was a purulent infiltrate, together with a certain amount of striate keratitis. The pupil was semidilated, there was considerable ciliary injection, and there was a large bead of pus in the anterior chamber. The iritis was not very marked and the aqueous was fairly clear. A smear preparation was made from the pus along the line of the wound and the staphylococcus albus was found. Five hundred million staphylococcal vaccine was given hypodermically, together with atropin and hot fomentations locally. After forty-eight hours the hypopyon had disappeared, the line of the wound was becoming less yellow in appearance, and the discharge from the eye considerably decreased. The improvement

daily was noted, and another dose of vaccine was given on the eighth day. At this time there was ciliary injection, but the iritis had practically subsided and the pupil was widely dilated. Two months later the eye was quiet, no keratitis punctata and no drawing up of the pupil, but there was a fine membrane in the coloboma.

In the other case, which was in a comparatively young and more robust subject, the pupil became drawn up and the cyclitis lasted some two months after the acute symptoms had subsided.

Similar cases successfully treated by staphylococcal vaccine have also been reported by Maddox³⁴ and Grimsdale.

2. Nonsuppurative. There is little doubt that pyogenic organisms of a not very virulent character can set up a nonsuppurative inflammation in the uveal tract after wounds into the globe, the source of infection, as I have pointed out elsewhere, being the conjunctiva.³⁵ It is this form of uveitis which gives rise to similar uveitis in the other eye—a condition known as sympathetic ophthalmia.

In chronic staphylococcal lesions of the skin, the organism has been found in the blood without producing much general change except that occasionally cachexia is present, and I would put forward as a possibility that the iridocyclitis which follows wounds in the globe and gives rise to sympathetic ophthalmia, may sometimes be due to this organism. In support of this, in one case I obtained a pure culture of the staphylococcus albus from the anterior chamber of the exciting eye. The vitreous was sterile. More proof is yet wanting before this theory can be established, especially by bacteriologic examination of the blood and of the exciting and sympathizing eyes. The agglutinative and bacteriolytic properties of the aqueous may also throw some light on the nature of the infection. That there is profound hematogenous change is shown by the fact that there is a large increase in the mononuclear leucocytosis in the blood in cases of sympathetic ophthalmia.³⁶ The affinity of the organism for similar tissues to that on which it originally grows, accounts probably for the selection of the other eye for its growth rather than the other tissues of the body. It is probable that the staphylococcus is the commonest cause of nonsuppurative inflammation in the uveal tract after operation. With this

idea in view, ten cases of cyclitis with K. P. were treated by me with vaccines. In five cases this K. P. cleared up after four inoculations at intervals of two weeks. These cases were without exception all in the early stages of the disease. In the other five cases the treatment extended over three months, but all eventually quieted down. In two of the latter cases the cyclitis was well established before treatment was commenced. In no single case did sympathetic cyclitis arise. In the five cases which were treated I think there was no doubt as to the beneficial effect of the treatment, as they seemed to show improvement in vision, according to their own statement, about the second or third day after the injection. This usually lasted for about ten days, when their vision usually began to get misty again.

It seems important, judging from these cases, that the treatment should be started as early as possible. The fact that in none of these cases sympathetic ophthalmia developed may possibly be due to the general immunity produced by the vaccines preventing the blood stream from becoming infected. In four cases of sympathetic ophthalmia treated by vaccines, no permanent benefit was derived. It is possible, if the disease is sometimes due to the staphylococcus, that the organism having gained entrance to the blood stream, any further stimulus of the tissues to produce protective bodies by the administration of more organisms is of little avail, owing to the stimulus already having been given from the exciting lesion. Upon these points more evidence is required, and it would for the same reason be of interest to know in cases of cyclitis due to other organisms, such as tubercle, which not infrequently affects both eyes, whether the second eye is ever involved after the administration of vaccine. In none of my own cases of tuberculous cyclitis was the second eye involved after the administration of tuberculin.

In conclusion, I have to thank my colleagues for their kind assistance in sending me cases, and for their observations before, during, and after treatment.

REFERENCES.

1. Comptes rendus de biologie, 1908, No. 33.
2. Deutsch. med. Wochenschrift, 1894, No. 36, 46.
3. Klinisches Jahrbuch, Vol. VI, 1897.
4. Deutsch. med. Wochenschrift, 1890.
5. Rif. Med., October, 1893.
6. Journal of the American Med. Assn., 1910, LV, p. 263.
7. Ibid.
8. La Cellule, Vol. XI.
9. Wiener med. Wochenschrift, 1895.
10. Menzer: Deutsch. med. Zeitung, 1903, p. 17.
11. Brit. Med. Jour., 1899, II, p. 1247.
12. Brit. Med. Jour., 1899, II, p. 1247.
13. Graefe's Arch. Ophth., Vol. 54, No. 1.
14. Deutsch. med. Wochenschrift, 1908, No. 48.
15. Berlin. klin. Wochenschrift, 1899, May 1st; 1906, Sept. 6th.
16. Berlin. klin. Wochenschrift, 1903, No. 48.
17. Rampoldi: Anal. di ophthalmologie, Vol. 37, No. 1-2-3.
18. Münch. med. Wochenschrift, 1907, LIV, p. 921.
19. Die Basedöwsche Krank., 1906.
20. Transactions Otological Society, Vol. XXX, p. 85.
21. Stephenson and Jessop: Transactions Otological Society, Vol. 22, 1902.
22. de Schweinitz: Therapeutic Gazette, October 15, 1910.
23. Transactions Otological Society, 1908.
24. Rampoldi: Wochenschrift für Therapie und Hygiene des Auges, 1909, p. 403. Annals of Ophthalmology, July, 1909.
25. Annali di ottalmologia, Vol. 38, No. 1-2.
26. Römer: Graefe's Archiv. Ophthalmologie, Vol. 54, No. 1.
27. British Medical Journal, Vol. II, 1899, p. 1247.
28. Dupey-Dutemp: Semarchal. Annales d'Oculist, May, 1910.
29. Holmes Spicer: British Medical Journal, October 25, 1911.
30. R. L. O. H. Reports.
31. Knapp, A.: Arch. of Ophth., 1908, Vol XXXVII, p. 235.
32. Trans. American Ophthalmological Society, Vol. 12, II, p. 598.
33. Derby: Trans. American Otological Society, p. 614.
34. Bacteriology of the normal conjunctiva in relation to operation wounds. Ophthalmoscope, August 1, 1910.
35. Ophthalmoscope, August, 1909.
36. Bacteriology of the Normal Conjunctiva. Ophthalmoscope, August 1, 1910.
37. Ormond: British Medical Journal, October 29, 1910.
38. Darier: Ocular Therapeutics.

XXIII.

TWO INTERESTING CASES OF FOREIGN BODY IN THE EYE.

G. GRIFFIN LEWIS, M. D.,

OCULIST TO HOSPITAL OF THE GOOD SHEPHERD; OCULIST AND
AURIST TO ST. MARY'S HOSPITAL; OCULIST
TO ST. VINCENT'S, ETC.

SYRACUSE.

Injuries of the eye with retention of the traumatic agent are of such frequent occurrence in the practice of every oculist that I might report a series of interesting cases. I have selected these two, first, because they are in many respects rather unusual, and, secondly, because they illustrate so well the uncertainty of the prognosis in many of these cases.

CASE 1.—On November 26, 1908, Mr. L. J. S., age 29 years, consulted me for an injury of the left eye. Earlier in the same day, while partridge hunting with a friend, he was accidentally shot by him. A number seven bird shot entered the eyeball just below and a trifle to the temporal side of the cornea, leaving a perfectly round hole through which the vitreous was protruding. It did not wound the lens, but passed through the lower part of the ciliary body. Tension was below normal, and the anterior chamber was filled with blood, so that an ophthalmoscopic view of the fundus could not be obtained. I clipped off the protruding vitreous, sutured the conjunctiva over the scleral wound and sent him to the hospital. There an atropin solution was instilled and iced antiseptic packs applied. During the next week the patient progressed rapidly, the blood in the anterior chamber was absorbed, the conjunctival wound healed nicely, the tenderness disappeared and, to a great extent, the tension improved. By December 4th, all inflammatory symptoms had subsided and the patient left the hospital. At that time vision was 16/200, and nothing could be seen behind the pupil but a black curtain.

On December 15th vision was only 2/200, but the patient could tell reflected light from any direction, showing that the fundus was intact. On March 21, 1907, the patient returned, bringing with him a letter from his physician, Dr. R. M. Joy, of Cazenovia, New York, which reads as follows:

"A week ago Sunday morning he was suddenly seized with a tonic convulsion and was unconscious all day (eight hours). His face was drawn on one side, and it looked to me as though the convulsion was caused by the shot in the eye, a reflex manifestation."

Examination showed no abnormal tension, no tenderness, and no inflammatory symptoms whatever; the pupillary reflexes were normal, and there were no evidences of sympathetic trouble of the other eye. I wrote the doctor that I did not think the injury had anything whatever to do with the spasm and sent the patient to Dr. C. E. Coon for an X-ray picture.

This demonstrated a double perforation, that is to say, the shot passed entirely through the eyeball and buried itself in the tissues of the orbit. There was a second shot in the alveolar process of the superior maxilla, of the presence of which the patient himself had been wholly ignorant. I was greatly relieved to know that the shot was not buried in the tissues of the eye itself, and continued treatment with less dread of the possibilities of sympathetic ophthalmia. On May 21, 1907, the patient called and informed me that the sight of his left eye was returning, and to my astonishment a test revealed a vision of 18/40. One month later it was 18/30, and in another two weeks, after fitting him with a glass ($+ 1.25$ S. $\ominus + 2.25$ cyl. axis 90) his vision was perfectly normal, and the visual field, with the exception of a small scotoma on the upper part of the field and a trifle to the outside of the median line, was also normal. Corresponding with this scotoma the ophthalmoscopic examination revealed a pearly white scar or atrophic patch just below and a trifle to the nasal side of the fovea centralis, where the bullet had passed through. The small amount of pigmentation shows how little was the reaction following the injury to the retina and choroid. With the exception of this lesion, so situated as not to interfere with direct vision, there were no other perceptible lesions. As the patient's vision was

almost normal, and as he felt no inconvenience whatever from the presence of the shot within the orbit, I concluded that it had become encapsulated, and decided to let well enough alone and not disturb it so long as it remained quiet. After a lapse of nearly four years, having escaped sympathetic ophthalmia, suppuration and detachment of the retina, I think we may exclude all probability of later complications, unless a cataract develops, which is quite likely, as there is at present a slight striated appearance of the lens. In addition to this, we must not forget that it is possible to have a subsequent contraction of the visual field followed by complete loss of vision, from a detachment of the retina, which may be brought about by degeneration of the vitreous humor and cicatrization of the scleral wound. Any vitreous enclosed within either the anterior or the posterior wound may become organized and form a part of the cicatricial tissue, which by contraction may at some future time produce detachment of the retina at a point situated opposite the seat of injury. The possibilities of this taking place, however, become more remote as time goes on.

CASE 2.—On May 10, 1906, Master W. J. S., aged 11 years, consulted me on account of a traumatism which had taken place nineteen days previous. While playing with a shotgun it dropped from his hands onto the sidewalk, exploding the cap, parts of which entered each eye and its surrounding membranes. Each eyeball was wounded in almost identically the same spot, namely, just on the corneal periphery at the nasal side and a trifle below the median line. The pieces had penetrated the cornea and the iris, wounding the lens, leaving a small opening through the iris and producing a traumatic cataract, but how many pieces there were and just where located I was unable to ascertain, on account of the cataractous lens.

Atropin was prescribed and both pupils dilated ad maximum, but there remained an adhesion of each iris to the lens capsule at the wounded point. Vision of the right eye was 18/30; of the left, 18/70. The traumatic cataracts developed so that on July 1st vision of the right eye was only 18/100 and of the left 4/200. By December 12th the patient was unable to count fingers at any distance with either eye. On April 23, 1907, I needled the right eye, and on July 23d I needled it the second time. On November 8th I needled

the left eye, and on March 5, 1908, the vision of each eye with the proper lenses was 18/15.

An ophthalmoscopic examination revealed in each eye a dark spot in the angle of the anterior chamber just behind the corneal cicatrix, which I took for the probable presence of the metallic chips, which had not become apparent until after the absorption of the cataractous lens substance. From that time to August 25, 1908, his vision was normal, both for distance and for close, so that he spent much of his time reading. On August 25, 1908, the vision of the right eye had dropped back to 18/30, on account of a piece of opaque lens substance having partially settled down back of the pupil. An X-ray picture was taken by Dr. A. J. Abeel on August 26, 1908, and two excellent plates were obtained.

This case is interesting, first, on account of the toleration of the foreign substances within the media without infection or sympathetic ophthalmia; second, on account of the very rapid absorption of the cataractous lenses after needling, and third, because of the excellent vision ultimately obtained. Corneal wounds, especially contused ones made by irregular fragments of metal, are likely to retain septic material and become quickly infected. It is possible that any adherent infectious germs were killed by the heat of the explosion or arrested in their development by the chemical action of the copper.

Be that as it may, the absence of iridocyclitis or sympathetic ophthalmia after such a wound in the sclerocorneal margin, and vision above normal after the presence for six years of at least one piece of copper within the media of each eye, is especially gratifying when we consider the fact that copper by its chemical action produces inflammatory suppuration without the intervention of microorganisms.

There may be encystment of the foreign bodies with a permanent continuance of good vision. Certainly I would not advise an interference unless their presence give rise to subsequent inflammatory reaction.

XXIV.

A CASE OF QUININ AMBLYOPIA.*

CARROLL B. WELTON, M. D.,

PEORIA.

In the case shown, while the symptoms manifested are similar to the many other cases of quinin amblyopia that have been reported, the ophthalmoscopic picture of apparently total atrophy of the optic nerves, with almost normal vision, seems to me of sufficient interest to again be worthy of record.

HISTORY.

Man, white, single, aged 31 years, was referred to me by Dr. J. F. Duane of Peoria on March 8, 1912. I found that he complained of defective peripheral vision, which troubled him in walking so much that at night he could not go about unless directly facing a light. On February 14, 1910, having what he himself had diagnosed as an attack of "grippe," and because someone had told him that a combination of "quinin and whisky was good for it," he had taken during a period of four hours, in the afternoon, fifty-five grains of quinin in the form of five grain capsules, and drank a quart of whisky. He then went to bed, and on waking the following noon he found that his vision was affected—things appearing very hazy; and he remembers that he stumbled over objects on the floor when he attempted to walk. He did not have at this, nor at any time, tinnitus or deafness, and the patient knew at the time the effect of quinin on the ears and remarked about it. The mental state was not affected, and there was no nausea or vomiting.

He then went to a hospital and took some medicine given him by a physician engaged in general practice, but no examination of the eyes was made. His friends were told by the

*Read at the Chicago Ophthalmological Society, meeting of April 15, 1912.

physician that there was nothing wrong with the eyes—that he was a “dope” fiend. His central vision improved until at the end of a week, when he left the hospital, he says he could read newspaper print. He then worked for an express company, but because of his tubular vision he had to give that up, as the work necessitated his seeing well enough to get in and out of a wagon many times during the day. He then took “electrical” treatments from an oculist, but without benefit to the eyes. He now works as a cook and waiter, and has the same trouble, in not being able to see coins when making change over the counter unless he turns the head downward.

The patient's father died at the age of 65, and his mother committed suicide when he was 18 months old. He has one brother, 32 years of age, in good health.

There is no history of cardiac or renal disease, and the patient has no tubercular manifestations. He has had epileptic attacks since he was 9 years of age, during which he does not become unconscious, but in which speech and sense of feeling are lost.

He is American born and attended school until he was 16 years old, when he had to stop on account of his convulsions. His vision, however, up to the time of the present involvement of the eyes, has always been excellent. He has used coffee and tobacco moderately. Before his eye trouble he drank beer to excess, and confesses to having been intoxicated a good many times.

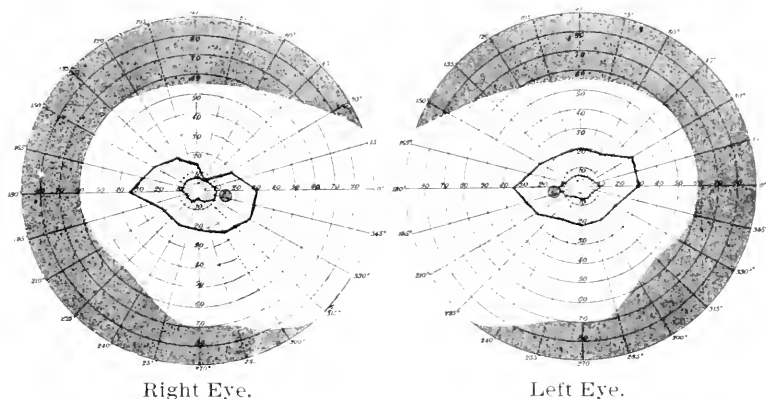
When a child his only sickness was measles—in adult life he has had gonorrhea and what he says was a “soft” chancre. He gives no history of any secondary lesions of syphilis.

The patient is a fairly well developed man, but his appearance suggests an anemia. The urine is negative to tests for sugar or albumin.

Examination of the eyes.—The vision is right 15/30, left 15/20. The pupils are equal and reaction to light is sluggish. Consensual reaction is present, as is also that to convergence; the refraction is a low myopic astigmatism; the accommodation is normal for his age.

The discs show an atrophic pallor, that of the right being more marked. The right disc shows a central cup in which the lamina is seen. The left disc has a small central cup, the nervehead being more filled in, the lamina almost completely

covered over. Both sets of vessels are greatly contracted, the arteries more so, they being threadlike in appearance. The arteries in the left eye are not involved to the extent of those in the right. The veins are larger in the right eye. Conversion of the vessels into white cords is not seen anywhere, nor is there any perivasculitis present along the vessels. The visual fields represented in the accompanying charts show concentric contraction both for form and color, the longest axis of the form field retained, as in most of these cases, being in the horizontal meridian. In the right eye the defect in the form field reaches into the fifth zone in the superior temporal quadrant. Color sense for blue and red is within the tenth area.



SUMMARY.

The points of interest in this case are: A moderate involvement of vision, coming on suddenly after the ingestion of a considerable quantity of quinin. Prompt restoration of central vision, within a week, which is not usual in amblyopia of this character. Permanent contraction of the visual fields, both for form and colors, resulting in a marked degree of hemeralopia. Marked contraction of the retinal vessels. Extreme pallor of the optic discs, simulating atrophy, but with nearly normal central vision.

The reason why central vision is retained in this case and other similar ones, where the ophthalmoscopic picture of atrophy is present, is, as shown by de Schweinitz,¹ that in sec-

tions of these nerves examined microscopically there are present extensive atrophic changes. However, certain fibrils still remain unaffected, as shown in staining, and he compares this condition as analogous to cases of alcohol and tobacco amblyopia in which there remain unaffected nerve fibers within the atrophic areas of the papulomacular bundle.

Ward Holden's² work on dogs, whose investigations have made clear the pathogenesis of quinin amblyopia, is well known to all. These findings are that in the production of this form of blindness there is first an inhibited blood supply, caused by the extreme contraction of the retinal vessels. Then follows a degeneration of the ganglion cell and nerve fiber layers of the retina. Finally, an ascending degeneration of nerve fibers follows the retinal changes.

Drualt,³ Birch-Hirschfeld,⁴ and Altland⁵ have confirmed Holden's observations that quinin blindness is due to a ganglion cell degeneration, but Drualt concludes that degeneration of the ganglion cells is not caused by the ischemia alone, but that it is, in part, the result of the direct action of the poison itself upon the cells.

Birch-Hirschfeld believes the lesion is primarily a degeneration in the ganglion cells and due entirely to the toxic effect of the quinin.

It would appear from these later observations that the toxic action of the quinin, if not wholly, is at least a partial factor in the production of this type of blindness.

The quantity of quinin which has produced amblyopia, as reported by various observers, has varied from a comparatively small dose to large amounts—as much as an ounce in twenty-four hours. Quite recently Manolescu⁶ has reported permanent contraction of the retinal vessels, with the ophthalmoscopic picture of atrophy of the optic nerve and some narrowing of the fields—these findings noted a year afterward—which had been produced by a dose of thirteen grains. In a majority of the cases the poisonous dose was an amount equal to or exceeding forty-five grains, and instances like the one just referred to are probably due to idiosyncrasy.

Of interest also are the reports of late improvement in vision under treatment, occurring long after the time that the drug had been taken (Carl Williams,⁷ Tyson⁸). This improve-

ment was shown not alone in the visual acuity, but in the return of function in the peripheral parts of the retina, as shown by enlargement of the form field.

REFERENCES. *

1. de Schweinitz: Norris and Oliver, 1900.
2. Holden: Trans. Am. Ophth. Soc., 1898.
3. Drualt: Internat. Cong. of Med., 1900.
4. Birch-Hirschfeld: Graefe's Archiv. für Ophthalmologie, 1900.
5. Altland: Klin. Monatsbl. für Augenheilkunde, XLII, 1904.
6. Manolescu: Klin. Monatsbl. für Augenheilkunde, XLIX, September, 1911.
7. Carl Williams: Annals of Ophth., 1908.
8. Tyson: Arch. of Ophthal., 1911, page 424.

THE RELATION^{*} OF THE TEETH TO THE EYES.

WILLIAM EVANS BRUNER, A. M., M. D.,

CLEVELAND.

The relation of the teeth to the eyes is not a new subject. The very name "eye-teeth" suggests how far back some idea has prevailed of a relationship between them. This paper has not been written with the idea of presenting anything new upon the subject, but is intended rather to recall to our minds that a close relation exists between affections of the teeth and ocular disturbances or disease. The association of certain eye conditions and diseases with changes in the teeth is interesting and important, as, for example, the relation between lamellar cataract and the so-called rachitic teeth, also that of interstitial keratitis and Hutchinson's teeth, but this is aside from the purpose of this paper. Cases are reported of pain in the teeth due to eye strain and relieved by the correction of ocular defect, but this also, while important of recognition, is not included in our subject, which has to do with the production of ocular disturbances or disease from abnormal conditions of the teeth. These group themselves into two classes, functional and organic, and I desire to report in brief some cases illustrating each class. The functional disturbance may be produced by an abscess or disease about the root of a tooth, or by an impacted tooth. These reflex effects will be produced more frequently when the teeth of the upper jaw are the ones at fault. It may show itself in disturbance of the pupil or the motility of the iris of that side, in restriction of the range, or complete paralysis of accommodation, spasm of the orbicularis, in disturbances of the muscle balance, in asthenopia or in amblyopia, more or less marked, with negative ophthalmoscopic findings, entirely relieved upon removal of the cause of irritation. Such a case of asthenopia, rendering the patient unable to use the eyes, has been under my observation for several years.

Mrs. B., age 27 years, consulted me November 27, 1908, with a history that she had worn glasses eight years, but had little or no trouble until the past two years. Dr. Runyon, her family physician, reported that this present difficulty followed almost immediately an ulcerated tooth. Four oculists since then have measured her for glasses without relief. She has pain in the eyes, headaches, dizziness and blurring after the use of the eyes; but no trouble at other times. Her general health is good, and her physician reports that she can find nothing to account for her trouble. Examination of the eyes shows very slight if any change needed in her glasses. Casual examination of the teeth shows numerous fillings, but there is no evidence of any active process. The nose shows some hypertrophy of the turbinates, tonsils are slightly enlarged. She was sent to Dr. J. F. Stephan, who reported undoubted trouble with two of the central incisors and probably with two bicuspid. I advised that these be attended to before we do anything further for the eyes. In February her doctor reported that she was still treating with the dentist and was practically free of headaches, except when she was very tired. The following November, a year from the time of the first visit, she reported that the eyes were doing finely and she was able again to use them. During the summer her dentist filled a left upper bicuspid. Shortly afterwards it began to trouble her, as did also the eye. The filling was removed, and in a week the eye was again all right. After treating the tooth for some time, he put in another filling last week, and already the eye is beginning to feel badly.

In April, 1910, she was again having some difficulty. Examination of the nose was advised and later refraction under atropin. I did not see her again then until December, 1911, when she reported that she has been better until recently, when she is again much worse. The dentist had established free drainage and as a result she could use her eyes all she wished. A dentist in an adjoining town then cut off both teeth and put on crowns, drilling through the root fillings in so doing. Ever since, the eyes have again been much worse, and she is now having almost constant headache. I went over her refraction at this time under a mydriatic, finding a slight change in each eye, and gave her an order for some new glasses. A month later she reported that the glasses worked finely for

distance, but that she could not use the eyes for close work. The eyes feel sore at such times, though she is having but little headache. I again advised her to see Dr. Stephan, who removed the roots of both upper incisors. Since then she is much better at times, but occasionally still has some of the same old discomfort. It is probably too early as yet to know of the final result.

Coopman¹ reports an interesting case of blepharospasm from physiologic eruption of a tooth. This occurred in a healthy child of three years, who made no complaint of the teeth. After five days of marked blepharospasm attention was drawn to the teeth. A slight swelling was observed back of the second temporary molar. Incision was made over the permanent molar, and in a day the spasm had completely disappeared. Theobald mentions a similar case, and also reports two cases of monocular paralysis of accommodation with mydriasis due to reflex dental irritation (*Prevalent Diseases of the Eye*, page 223). I have recently seen a small child who manifests strabismus with the eruption of her teeth, and disappearance of the squint when the tooth is through the gums. I have also in a few instances seen cases of asthenopia in children who were having their teeth straightened, all the symptoms disappearing when the braces and all pressure have been removed.

Blindness following the extraction of a tooth has been reported. Dr. Reber² reports the case of a woman whose right eye, following the extraction of a tooth, showed dilated pupil, not responsive to light, but active in accommodation and some loss of accommodation. This gradually improved, and she then developed convergent squint of the right eye with diplopia. Examination of her general condition revealed patches of anesthesia, and the fields showed marked contraction of form and reversal of color fields. Under hypnotism she completely recovered. He and also Nance³ have written at length upon this subject and given extensive bibliography.

Organic or structural changes in or about the eye resulting from the teeth may take many varied forms, and cases are on record illustrating inflammation of almost every structure of the eye dependent upon or at least attributed to dental trouble. Abscess of the orbit is well recognized as sometimes coming from an abscess about the root of a tooth. Some years

ago the following case⁴ was seen by the writer. It resembled at first an orbital abscess, but proved to be more serious.

J. H., age 40 years, was first seen December 11, 1898, because of pain and swelling about the right eye. His family and personal history were negative. Five days previously, because of teeth which with some swelling of the jaw had troubled him several weeks, he visited one of the surgical clinics in the city. I have since learned from the physician who attended him that an abscess was found near the alveolar border on the right upper side, the opening of which was followed by free evacuation of pus. The tooth was readily extracted, and he was told to rinse his mouth every hour with hot saline solution. Apparently the same day he began having pain in the right eye with some swelling about it. Both symptoms rapidly increased, despite treatment given him by a physician of the neighborhood, until the fifth day, when he was sent to Charity Hospital, where I saw him. There was then marked proptosis of the right eye. The lids and all the surrounding tissues were enormously swollen, very tense and dusky red in color. The edematous bulbar conjunctiva projected between the lids. The swelling was so intense and the tenderness so great that it was impossible to open the eyes sufficiently to get any view of the cornea or to ascertain his vision with that eye. The patient had not slept at all for several nights and was suffering greatly. He presented a general septic appearance, was sweating profusely, his temperature was 104° and the pulse 86. Hoping that he had simply an orbital abscess, we decided to operate at once. With the patient under ether a good view of the eyeball could be obtained, and there was not the slightest indication of panophthalmitis. Free incisions in the orbit failed to find pus, and it was evident that the trouble was deeper seated. His temperature continued to go higher, with very great daily variations, profuse sweating and rapid pulse. By December 15th, four days later, edema of the lids and bulbar conjunctiva of the left eye were very marked, and our fears of the past few days that it was a case of thrombosis of the cavernous sinus were confirmed beyond any doubt. The patient became totally blind, even to perception of light, the pupils were dilated; his mind remained clear. The ophthalmoscope showed in right eye a slight papillitis and several hemorrhages; in left eye the ar-

teries small, the veins slightly tortuous, but not much dilated, the edges of the disc hazy, but the disc itself not swollen. Without going into detail in regard to the further history of the case, it might simply be said that it ran a typical though somewhat prolonged course of this disease, until the patient died December 26th. Unfortunately an autopsy could not be obtained.

The following case is the most marked and conclusive of any coming under my observation, showing inflammation of the structures of the eyeball dependent upon the teeth.

Miss F., age 27 years, consulted me March 20, 1908. Her general health has always been excellent, and she has been able to use her eyes all she wishes without any discomfort, except that they occasionally get tired. Six or seven years ago she had some inflammation of the right eye for several months, and last Christmas she had a small ulcer on the eye. The right eye has been inflamed now for three weeks without any appreciable change for the last two weeks.

To the outer side of the cornea was a round, slightly elevated, reddened patch three to five millimeters in diameter, presenting the appearance of an episcleritis and possibly also some scleritis with considerable congestion about it. The fundus was hyperemic, but showed nothing pathologic. Vision: O. D. 6/15 + readily improved by + 1.00 cylinder axis 90 to 6/6 partly. O. S. 6/6 partly, improved by + .50 cylinder axis 90 to 6/5.

With an indefinite history of some rheumatism, she was given some aspirin with appropriate local treatment, and a week later the eye was decidedly better.

April 13th she reported again, stating that for two or three days the eye had been worse. The patch of congestion was larger, with decided tenderness, the media were hazy, and the best vision obtainable with a glass was 6/12. Atropin was then instilled and she was given sodium salicylate. A week later the eye was improved, the tenderness and redness decreased, but there was a little thickening at the limbus and some cloudiness of the cornea adjoining, with slight vascularization. On the 25th, the deep discoloration of the sclera was more pronounced. In the meantime I had had a letter from her family physician, indicating that both the family and her own personal history were excellent, and he could find

nothing in her present condition which might have any bearing upon the eye.

May 1st. The eye has been worse for several days, bulbar injection more marked, purplish in color up and out, pupil irregular and numerous posterior synechiae, though she has been using atropin. I again examined her nose, which showed slight hypertrophy of the turbinate on the right side. I had previously asked about her teeth, but I now examined them for myself, even though they were giving her no trouble whatever. She had, however, had considerable difficulty with them in the past. Upon examination I found a little tenderness above the last upper molar on the right side, and a fistula on the inner side of the gum near it. She had recently had gold caps put on a number of her teeth, and subsequent events showed that these teeth had not been properly prepared before the caps had been put on. I sent her at once to Dr. Stephan, who found an abscess at the root of the last upper right molar and the teeth in general in bad condition. A set of X-rays were made, showing several abscesses and the roots of other teeth not properly filled. Dr. Stephan removed the cap from the second molar and found very fetid pus at the root. I wished her to remain in the city for treatment of the teeth, but she insisted upon going to her dentist at home. The eye began to improve at once, but three days later, though atropin was pushed, the posterior synechia was still present. By using eserine and following this by atropin at the office, I succeeded in breaking loose all the adhesions, and the following week the eye was much better, pupil widely and evenly dilated, and the patch of scleritis less pronounced. The dentist had established free drainage through the second molar and was treating it daily.

On the 18th the eye became worse again and the dentist removed the tooth and found necrosis of bone about its root. He also removed the necrosed bone and the eye at once began to improve. The infiltration of the cornea was smaller.

June 6th she again reported, with the history that ten days before the dentist had removed the cap from the next molar and drilled into the root. The eye had been doing nicely at this time, but at once pain started in it again with marked inflammation. The right side of the face became swollen and the whole jaw very sore. On the possibility of the antrum

being involved, she was examined by Dr. Ingersoll, who reported no indications of any infection. The grayish infiltration of the cornea, up and out, just inside of the limbus, was more marked, with several small spots near to and one just within the pupillary area, and several others also in other parts of the cornea.

June 17th she again began having more pain and redness in the eye, and the following day the dentist removed two more molars, one on each side. On the 20th she came to Cleveland and consented finally to put herself under Dr. Stephan's care, as urged by me upon every occasion. He removed all but two of the nine crowns at once, and several days later removed these also. Following the operation upon the teeth and also upon the bone, the face and eye were very sore for several days, and then improvement began very promptly and continued uninterruptedly. Within a day or two she was able to sleep all night, something she had not done for two weeks, and in another week's time the eye was perfectly white. She recalls now that the trouble with the eye began immediately after her home dentist put the crown on the second molar tooth, though at the time she had not associated the two facts.

August 27th the eye was looking and feeling fine, spots on the cornea were smaller and fainter. There were numerous spots of pigment on the anterior capsule of the lens, the iris was perfectly free, the fundus normal, vision equaled 6/12 partly. The patient is looking unusually well and has gained eight pounds in weight. In November I went over her refraction under a mydriatic and obtained 6/5 vision in each eye. I last saw her in May, 1910. Vision was 6/4 partly in each eye. The eyes were giving her no trouble unless she overused them. In the right there were some fine lines, like remains of blood vessels at the site of the old patches of infiltration. The fundus of each eye was in good condition.

The following case of episcleritis appears to have been caused by the teeth: Miss E. C. consulted me in April, 1909, with a history that about three weeks before the left eye became injected. She had been using her eyes severely, and just at the time the eye became inflamed she had had a swelling about the teeth and the left upper jaw. Examination showed episcleritis with possibly some inflammation of the sclera itself upon the inner side of the left cornea extending

up to the limbus, with slight swelling and tenderness over the patch. Ophthalmoscopic examination showed the fundus normal, vision 6/5 in each eye. Her general health was excellent, and she was advised to see her dentist.

April 16th she was using local treatment as directed and was taking a tonic, but she failed to see her dentist and the eye showed no improvement. She then saw Dr. Price, who found an infection involving "both the pericementum and the alveolus about the upper left first molar, caused by a putrescent pulp infecting all the teeth." With proper treatment of the teeth the eye promptly and steadily improved, and when I next saw her the eye was entirely well and had remained so when I last heard from her in December, 1909.

In another case of iritis under my observation the teeth seemed to be an important factor in the causation, but as she also had diabetes we cannot be so certain that the teeth were the only causative factor. Miss S., age 45 years, first consulted me for glasses April, 1908. I found some maculae of the cornea in the right eye, and in each eye some fine striae in the periphery of the lens.

O. D., — 3.50; V. = 6/22

O. S., — 3.50; V. = 6/15

December 17, 1908, she again consulted me with the history that the left eye had been inflamed two weeks. Trouble began with toothache on the left upper side and swelling of the face. As the swelling subsided, pain developed in and about the left eye. Examination showed iritis with posterior synechia. She was put upon appropriate local treatment, sodium salicylate internally, and sent to her dentist, Dr. Ziegler, who reported pyorrhea alveolaris in bad form, with pus exuding from the gums. The same day he removed the second upper left bicuspid and the first molar, and found an abscess at the root. The eye felt much better the next day, and by the second day the injection was markedly decreased, though the pupil was not yet perfectly dilated. Improvement was prompt and uninterrupted, so that within three or four more days all inflammation had entirely disappeared. Her family physician later discovered that this patient had diabetes, but she had no treatment whatever for this until after the eye was entirely well, so it seems doubtful whether the diabetes had anything what-

ever to do with causing the iritis. Our only treatment had been local and the correction of the dental difficulty.

Dr. Risley⁵ reports a case of acute purulent inflammation at the root of a molar tooth, with extension of disease to the maxillary antrum, followed by general uveitis which resulted in blindness and sympathetic irritation of the fellow eye (Transactions of American Ophthalmological Society, Vol. XI, page 690).

Ulcers of the cornea of various types have been attributed to the teeth by various writers. de Schweinitz⁶ says: "Teeth should always be examined, and if faulty the case turned over to a competent dentist. The frequent relation of carious teeth to corneal ulceration is well established, and the irritation of a new dentition in young children has been found to be the cause of abscess or ulcer of the cornea."

"The possibility that an intractable keratitis may be due to reflex dental irritation should not be lost sight of," writes Theobald.⁷ "Dead teeth always, it would seem, on the side of the eye affected and usually in the upper jaw, are more apt to produce such consequences."

The following case is suggestive of the relationship between the teeth and eyes, though it may be only a coincidence: Mrs. D., age 32 years, consulted me October 12, 1911, with a history that three weeks ago she had the right and left eye teeth pulled. The left tooth was broken, but the dentist told her he removed all the root. The jaw was very sore for several weeks afterwards. The next day the left eye pained her, and this pain continued for a week, when she noticed a blur which increased as the pain lessened. She says she never had any previous eye trouble. Examination showed in the left eye some descemetitis, floating vitreous opacities, and up and in from the disc a patch of fresh choroiditis. The right eye was perfectly healthy. Her history was negative and general health excellent. She was put upon absorbent treatment, mercury and potassium iodid, with gradual improvement and absorption of the exudate. Vision slowly improved, so that by December 12th with the correcting glass she had normal vision in each eye, and when last seen, February, 1912, she was having no further trouble. One doubtful feature as to the causative relation between the teeth and the eyes was the fact that this same eye showed some remains of a semiatrophic patch of previous choroiditis.

I am at present treating a case of interstitial keratitis where I suspect the cause lies with the teeth. The patient did not complain at all of his teeth when I questioned him. I found, however, numerous fillings and crowns, and for some reason or other was suspicious of the teeth. I sent him to a dentist, Dr. Weaver, for an examination and X-ray. Pus was found beneath several fillings, and an X-ray revealed a large abscess on the upper right side. He is now undergoing treatment, and it is too soon as yet to tell the outcome. His general condition certainly has improved and the eye is feeling better.

Pyorrhea alveolaris has not infrequently been reported as the cause of ocular disturbances. An important point in reference to this and other septic conditions about the mouth is that when such is found in a patient upon whom an operation upon the eyeball is contemplated, it is most important to correct this septic condition before proceeding to any operation. Knapp⁷ reports a case of blindness from periostitis originating from caries of the teeth extending to the floor of the orbit, where it caused some thickening and involved the optic nerve within the canal.

Priestly Smith reports a case of glaucoma due to irritation from the teeth. Sterling⁸ reports a case of blindness due to optic atrophy in a child four years old, following severe hemorrhage after the extraction of a tooth.

An important fact to remember, or rather one of the chief facts upon which, in conclusion, I wish to lay special emphasis in the relationship of defective teeth to irritation or actual inflammation of the eyes, is that not infrequently the patient is wholly unconscious of anything wrong with the teeth, will state that they have them examined regularly by a supposedly competent dentist, and will insist that the teeth are in good condition. I have grown to be suspicious of a mouth showing numerous gold crowns and fillings. I place a great deal of weight upon an X-ray examination, and if I do not feel certain of the work which has been done, or the reliance which can be placed upon the patient's dentist, I insist upon a set of radiographs being taken by an expert in whom I have confidence, so that I am in a position to judge for myself the condition of the teeth. I have thus, as indicated in this paper, succeeded in several instances in finding abscesses at the roots of teeth or improperly filled roots, where nothing wrong was

suspected by the patient, with the result of obtaining relief of the ocular symptoms by treatment of the pathologic dental condition.

LITERATURE.

1. Coopman: *La Clin. Opht.*, July 25, 1905.
2. Reber: *Ophthalmology*, Vol I, p. 48.
3. Nance: *Journal of American Medical Association*, 1904.
4. Bruner: *Ophthalmic Record*, July, 1899.
5. Risley: *Transactions of the American Ophthalmological Society*, Vol. XI, p. 690.
6. de Schweinitz: *Text book*, p. 329.
7. Theobald: *Prevalent Diseases of the Eye*, p. 222.
8. Knapp: *Archives of Ophthalmology*, Vol. XXXI, p. 280.
9. Sterling: *Ophthalmic Review*, August, 1904.

SUPRARENAL EXTRACT IN THE TREATMENT OF ACUTE CORNEAL STAPHYLOMA.

PAUL J. PONTIUS, A. M., M. D.,

ATTENDING SURGEON, WILLS HOSPITAL; OPHTHALMOLOGIST,
ST. JOSEPH'S HOSPITAL,

PHILADELPHIA.

The extract of the suprarenal gland has been used for the relief of pain in all forms of keratitis, and has also proved successful in the reduction of tension in acute glaucoma. Experimentally it has been found to reduce the formation of the aqueous humor in animals, and an eminent authority has reported one case of double glaucoma, in which the solution not only relieved the pain, but caused some contraction of the pupil. On account of this physiologic action, the writer was induced to use it in acute staphyloma of the cornea, so often seen as a sequel of ulcerative and sloughing keratitis, instead of resorting to paracentesis and a pressure bandage, or later doing a partial excision of the cornea.

Dr. Sajous, the eminent authority on the physiologic action of the glandular extracts, says: "The influence of the extract of suprarenal gland is explained by the great rise of metabolic activity it engenders directly to the muscular elements of the arterioles that supply the cornea and sclera. The caliber of the arterioles being reduced by the contraction of their muscular coat, the volume of blood plasma admitted to the ocular structures is greatly reduced. The veins which carry off the blood from these structures are not influenced, however, and the intraocular tension is relieved merely because more fluid leaves the eye than is supplied by the arterioles."

The following brief histories, taken from the records of the Wills Hospital, will illustrate the effect of epinephrin on acute ectasia of the cornea:

Case 1.—F. N., aged 32 years, was admitted to Wills Hospital with the history of having been struck in the left eye

three weeks before with a piece of plaster. Examination revealed an ulcer involving the upper half of the cornea, with two small dense foci below. The whole cornea was hazy, with intense ciliary congestion and large hypopyon. The hypopyon was removed by a keratome incision from below. Eighteen days later the ulcer was clean, but beginning to bulge, and suprarenal extract, 1-1000, was added to the treatment. At the end of two weeks the patient was discharged, the bulging of the cornea having been reduced to normal.

Case 2.—R. S., coal miner, aged 40 years, was admitted to Wills Hospital with a large ulceration of the cornea. Injury was caused by a piece of coal, nineteen days before. Almost the entire cornea was opaque and sloughing. Hypopyon filled three-fourths of the anterior chamber, which was removed by a keratome incision through the cornea below. Seventeen days later ectasia developed, and suprarenal extract, 1-1000, was instilled in conjunction with the regular treatment. Ten days later the eye was quiet, cornea not ectasic. Two weeks later he returned to his home with no bulging, although the cornea was still hazy. Tension normal and vision of light perception and projection.

Case 3.—J. W., a stevedore, aged 40 years, returned to the clinic one week after having been discharged from the house, following an attack of ulcerative keratitis, with the cornea bulging about three mm. A pressure bandage was applied and eserine instilled, but he complained of the twitching and the annoyance of the bandage. Suprarenal extract, 1-1000, was instilled, and he remained during the clinic hour. As he felt relieved, he was sent home with orders to instill this solution three times a day. He returned two days later, stating that he was more comfortable, and upon examination less bulging of the cornea was found. The treatment was continued, and at the end of four weeks the bulging had entirely disappeared.

Case 4.—F. B. W., male, aged 50 years, was struck in the left eye by a piece of glass, causing a linear perforation of the cornea 3 mm. long, extending from limbus toward center, with prolapse of iris and traumatic cataract. He was admitted to the hospital. Iridectomy was performed and the lens curetted. Infection of the wound occurred, with some involvement of the anterior chamber. There was delayed healing of the wound, with a thin cicatrix, which rapidly and

markedly bulged. Suprarenal extract was used and the cornea gradually became flat and firmly cicatrized. Three months later there was no bulging of the cornea.

Case 5.—J. P., aged 17 years, was admitted to the hospital with a lime burn of the entire cornea and conjunctiva. He was given the usual house treatment for burns. Three weeks later the cornea had sloughed almost to Descemet's membrane and was beginning to bulge, the eyeball showing increased tension. Suprarenal extract, 1-1000, was instilled three times a day. Three days later there was no bulging, although the cornea was very thin. Tension was normal. Slight symblepharon of the upper lid, with a tendency to entropion. In four weeks he was discharged from the house with normal tension, vision of light projection, and no bulging. One month later he returned to the clinic with vision of fingers at two feet. Cornea very hazy, but no semblance of ectasia.

Case 6.—C. R., male, aged 26 years, admitted to Wills Hospital after two weeks' treatment elsewhere. He had a deep disc shaped ulcer in the center of cornea. Hypopyon to level of iris margin below, pupil contracted, and deep ciliary injection. Four days later hypopyon disappeared, pupil partly dilated, ulcer not spreading. One week later patient was taken with a severe attack of ulcerative tonsillitis, the corneal ulcer rapidly increased, followed by perforation and slight prolapse of iris. Suprarenal extract, 1-1000, was added to the regular treatment, together with a stronger solution of atropin. The iris was freed, and no bulging followed.

These case histories demonstrate the great value of epinephrin solution, 1-1000, when applied to a class of cases that are usually considered hopeless. All the cases treated in my clinic during the past three years have been relieved when the solution was used as directed. Several of my colleagues, who have tried this treatment, report a like degree of success, and I am thereby encouraged to lay this observation before the profession for further study and report of results. Briefly stated, the extract of suprarenal gland has no specific effect on corneal tissue, but reduces staphyloma of the cornea by constricting the arterioles, thus relieving the pressure in the lymph areas and causing a reduction of the intraocular tension whereby the cornea is permitted to resume its natural form.

ABSTRACTS FROM ENGLISH OPHTHALMIC
LITERATURE.

(UNITED STATES OF AMERICA.)

BY

MATTHIAS LANCKTON FOSTER, M. D.,

NEW ROCHELLE.

HAROLD G. GOLDBERG, M. D.,

PHILADELPHIA.

OSCAR WILKINSON, M. D.,

WASHINGTON.

AND

ARTHUR F. AMADON, M. D.,

BOSTON.

Argyrosis.

EWING, A. E., St. Louis (*American Journal of Ophthalmology*, April, 1912), gives an excellent study of the histology of argyrosis of the conjunctiva, profusely illustrated, to which is appended a note on a case by Adolf Alt. M. L. F.

A Brochure on Trachoma.

WHITE, DANIEL, AND TREIBLY, CHARLES, U. S. Army. This is an exhaustive paper based on personal experience among 100,000 Indians of the United States, who have suffered for many years with this disease, which has been known simply as sore eyes, and has not been regarded as the true cause of blindness. Trachoma exists in from 60 to 80 per cent of the entire Indian population of the United States. It is very

prevalent in the West and Southwest, Illinois, Missouri, Oklahoma, Arkansas and Texas.

The direct cause of trachoma is supposed to be a germ, but whether this is a bacillus or a parasite is a divided opinion. Recently the trachoma bodies of v. Prowazek have been found, and in the West these bodies are considered to be useful aids in diagnosis. Among the indirect carriers of the disease are dirty fingernails, bed clothing, wearing apparel, wash basins, towels, etc., as well as door knobs, school supplies, gymnasium equipment, swimming pools, etc.

The authors suggest this diagnostic point: When the patient reads the test card the vision is 20/100 in both eyes, but after the instillation of a few drops of a solution of homatropin into the eyes he is able to read from 20/70 to 20/50, the improvement in vision being due to the dilatation of the pupil, which gives a greater field of vision over the nebula, which will be found on examination in the dark room. Isolation and the individual use of towels, beds, baths, etc., are strongly recommended, as well as ventilation, good food, tonics and the use of absorbents. In operative treatment the use of sandpaper and of sanded orange wood sticks, which are made in five different shapes so as to reach every portion of the eyelid, is recommended. Where the foregoing procedure fails, the operation known as the combined excision may be resorted to.

O. W.

Serpiginous Ulcer.

CHARLES, J. W., St. Louis (*American Journal of Ophthalmology*, May, 1912), reports a case of serpiginous ulcer of the cornea, met with in a miner 57 years of age, which involved the entire cornea, but recovered under treatment with staphylococcus vaccine and urotropin.

M. L. F.

Operative Treatment of Conical Cornea.

GOLOVINE, Moscow (*Ophthalmology*, April, 1912), contributes the history of a very instructive case of a young man with conical cornea, which rapidly progressed until vision was almost zero. The summit of the cone was cauterized with the thermocautery for a space of 3 mm. in diameter. The cornea was so thin that it was perforated and the anterior chamber was emptied. For twenty-three days a fistulous opening maintained itself in spite of treatment, and then con-

junctival transplantation was done, according to the method of Kuhnt. A strip of bulbar conjunctiva, maintained at its two extremities by pedicles, was brought over the cornea, covering the wound, which had been previously revived by curetting. The bridge was secured in position by sutures. The conjunctival graft became firmly fixed and the anterior chamber reestablished itself. Ultimately the eye showed a central, round leucoma 3 mm. in diameter and a perfectly spherical, normal cornea with uncorrected vision of 0/7. A. F. A.

Rupture of Descemet's Membrane Due to a Blow from a Blunt Object.

McCOOL, JOSEPH L., Portland (*Ophthalmology*, April, 1912), reports a case of rupture of Descemet's membrane, one of the rare forms of ocular injury, following a blow upon the eye by a blunt object. A very complete review of the literature bearing upon this injury is given. The patient was struck a blow upon the forehead and eye which rendered him unconscious. Examination the next day showed all parts of the eye intact, except that the cornea was hazy and the anterior chamber was partly filled with blood. A fine grayish white line 5 mm. long occupied the apex of the cornea, situated in its deeper layers and nearly in a vertical direction except where it inclined toward the temple about 30°. Several smaller lines radiated from near the apex of the cornea. The patient recovered with normal fundus and corrected vision of 5/6. A. F. A.

Points in the Treatment of Corneal Ulcers.

WRAY, CHAS., London (*Ophthalmic Record*, May, 1912), remarks that the first step in cases of corneal ulcer should be to see that no mechanical causes of ulceration exist, and that the lacrimal passages are in good working order. After many inquiries he has found that the excrement of children affected with corneal ulcer, particularly the phlyctenular ulcer, is usually very offensive. Referring to the fact that Dr. Ziegler recently called attention to the necessity of attending to the condition of the bowels in these cases, the writer advocates, in addition to this, the necessity also of antiseptics. He remarks that Mr. Arnold Lawson has recently showed how patients infected with the colon bacillus, infected the conjunctiva.

He also remarks that in many cases of corneal ulcer the mouth is in an exceedingly unhealthy condition, and says: "Once it is realized how organisms may be conveyed from the anus, mouth and urine, one of the first rules in the treatment of corneal ulcer will be: 'The eyes should never be touched with unwashed hands.'" O. W.

Acute Plastic Iritis Markedly Benefited by Antistreptococcus Serum.

BRADBURN, A. A., Manchester (*Ophthalmology*, January, 1912), reports a case of general streptococcic infection, presumably from necrotic alveolar inflammation, which terminated in severe plastic iritis of both eyes. Ten cc. of antistreptococcus serum was given, and in three hours the temperature rose to 99° and soon the eye became more injected. Twenty-one hours later, the injection had subsided to a marked degree and the deposits were clearing. The patient's general condition showed equal improvement. A second dose was administered as a precautionary measure, which was followed by severe reactionary symptoms. A. F. A.

Sarcoma of the Choroid—Unusual Clinical Features.

GREEN, JOHN, JR., St. Louis (*American Journal of Ophthalmology*, June, 1912), reports a case of sarcoma of the choroid, occurring in a man 37 years of age, which presented the curious points that the first symptoms came on during an attack of pertussis, that the growth of the tumor was extremely slow, and the tension in the eye which contained the tumor was diminished. M. L. F.

The Sliding Flap in Cataract Operations.

FOX, L. WEBSTER, Philadelphia (*Ophthalmology*, January, 1912), advocates the sliding flap operation, as described by van Lint, in order to avoid the danger of infection of the corneal wound and to secure gentle pressure upon the edges of the wound, thus preventing prolapse of the iris and securing more rapid healing. The conjunctiva is separated around one-third of the upper edge of the corneoscleral border and undermined for a distance of 8 or 10 mm. Two black silk threads are inserted through the loosened conjunctiva and

brought out through the attached conjunctiva, near the corneo-scleral margin below on both sides of the cornea. After the delivery of the lens in the usual way the sutures are drawn up and tied, thus bringing the undermined flap of conjunctiva over the upper fourth of the cornea with some pressure. This leaves the pupil uncovered and the eye generally free for inspection. The flap draws away in a few days, and the sutures may be removed in five or six days. This method, while always advantageous, is of particular value in cases of increased blood pressure, or when the danger of infection is particularly great.

A. F. A.

Intracapsular Extraction of the Cataractous Lens.

SATTLER, ROBERT, Cincinnati (*Transactions American Ophthalmological Society*, 1911), says that the von Graefe method of modified linear extraction has given general satisfaction, except that the delivery of the lens through the torn capsule, leaving the fragments of the capsule and debris behind, is its weak point. The Smith method removes this objection. It has been well demonstrated by this method that the rupture of the brittle senile zonula through certain pressure movements against the outside of the globe is practicable and easy. The choice of this method is indicated when the capsule is thick and opaque, the lens swollen, and the edges not too angular.

A. F. A.

The Crystalline Lens as Figured in the Text Books and as Seen in the Eye.

HOWE, LUCIEN, Buffalo (*Ophthalmology*, January, 1912), after describing and picturing the phacometer and giving an easy way of converting the ophthalmometer into a phacometer by the removal of the prisms, and reviewing the formulae useful in calculating the position of the lens and the changes which it undergoes during accommodation, proceeds to give a few of the results of observations by this method of research. First, the axis of the lens usually points slightly downward and toward the temple at its anterior end. Second, during accommodation the entire lens apparently moves slightly downward. Third, the posterior surface of the lens changes but little during accommodation, and the anterior

surface changes to a decided degree, the central portion assuming a kind of conical projection or bulging forward. The posterior surface also changes irregularly as compared with other parts. Fourth, it is evident that these changes produce astigmatism of irregular form, though of low degree, and must cause varied and unequal demands upon different parts of the ciliary muscle. A. F. A.

Report of a Case of Vessel Formation in the Vitreous.

DUNN, JOHN (*Archives of Ophthalmology*, May, 1912), found in the vitreous two highly vascular, glistening, transparent fibrous masses. The summits of these masses were to be measured by an 8 D. lens. They consisted of blood vessels which varied in size from some as large as the largest retinal arteries to vessels too small to be clearly made out under the examining lens. They anastomosed extensively. Except for a few minute opacities, the surrounding vitreous was perfectly transparent. In the fellow eye, in which the sight had been failing for nine months or more, the vitreous was so filled with exudate as to reduce the vision to counting fingers indistinctly at four feet, and to prevent any satisfactory examination of the postlenticular regions. H. G. G.

A Case of Optic Papilledema and Paresis of the Third Nerve Caused by Inflammation of the Ethmoidal Sinuses.

McCUBBIN, J. B., AND GUNDELACH, C. ARMIN, St. Louis (*American Journal of Ophthalmology*, May, 1912), report a very interesting case. The patient, 20 years old, complained of headache that had persisted for seven years in the frontal and temporal regions of both sides of the head, and finally developed internal ophthalmoplegia and papilledema. At the first examination, repeated three times at intervals of four and seven days, the nose was found negative in every way. Later a clearly marked sphenoidal and postethmoidal suppuration on the left side was found. Free opening and drainage of the sinuses relieved the headache and greatly improved the ocular symptoms. M. L. F.

Bilateral Papilledema with Central Scotoma from Sinusitis.

PARKER, FRANK JUDSON, New York (*Ophthalmology*, January, 1912), reports a patient, age 38, who, four days before,

noticed slight blurring of the vision, gradually increasing. Examination showed slight neuritis, with retinal edema and venous engorgement in the right eye. Left eye normal. A few days later similar conditions appeared in the left eye, rapidly increasing in both eyes to marked neuritis with central scotomas and great loss of vision. There had been no pain or headache. An X-ray examination did not show indications of sinus involvement. Nasal examination showed slight congestion of the middle turbinate with discharge from the right antrum only. A diagnosis of sinus disease was made from the eye conditions alone. Removal of the middle turbinates and curetting revealed pus cavities, and their drainage relieved the eye conditions immediately. Closure of drainage at one time was immediately followed by aggravation of symptoms.

A. F. A.

Orbital Cellulitis With Report of a Case.

HOLDSWORTH, F., Traverse City (*Ophthalmic Record*, June, 1912), reports a case in which, when first seen, the tissues of the right orbit were firm and tense with dusky hue, the eye was exophthalmic and deviated to the right. There was ethmoiditis with purulent discharge on the same side. The middle turbinate was swollen and pale. The right arm suffered from severe pain and twitching. An operation was immediately performed. A curved incision was made on the inner side of the orbit. No pus being found, a second one was made through the elevated periosteum, which also failed to find pus. Other incisions were made, both in the outer and superior parts of the orbit, and also in the conjunctiva, and gauze drainage established at the inner side of the orbit, from which there was a discharge of pus next day. About two weeks after the operation the patient had diplopia and some pain. Five weeks after the operation the ethmoid cells were curetted. At the time of writing, the general condition was improved, the vision was normal, and the cosmetic result satisfactory.

O. W.

A Case of Edema of the Orbits, Secondary to Facial Dermatitis.

HANSELL, HOWARD F., Philadelphia (*New York Medical Journal*, August 3, 1912), reports a case which resembles one of facial erysipelas so much that he says "that diagnosis would have been made unconditionally were it not that the

line of demarcation characteristic of that affection was not present. The left cheek was flushed and swollen, unyielding, hard to the touch, not sensitive, and distinctly higher in temperature than the forehead. The right cheek was similarly affected, but much less in degree. The left conjunctiva was puffed, arranged itself into folds as the eye was turned in various directions, and was formed into a ridge by the closing of the lids. The edema could be shifted into areas of swelling by pressure upon, and movements of the lower lid by the finger. The eye was unaffected and the vision was good.

An injection of 20 cc. of streptococcic serum was given the first day; 30 cc. the second, and 40 cc. the fourth day after admission to the hospital. The dermatitis in the left side and the orbital edema became promptly better, but the disease itself was not favorably influenced, as was shown by increased swelling and infiltration of the skin and orbit on the right side. Urinary and blood examinations threw no light on the etiology."

The patient had resided the year before in northern Canada, where the temperature remained for five months at zero or below, and it was learned that the disease was epidemic there. Its cause had not been established, but it was attributed to the excessive cold and its sudden cessation. The symptoms subsided at the end of a week.

M. L. F.

The Skiascopic Test—A New and Original Explanation.

WADDY, R. GRANVILLE, Oxford (*Archives of Ophthalmology*, May, 1912), claims that the principle upon which this explanation of the movement and locality of the shadows of skiascopy is based is that of regarding the emergent rays from the observed eye as all important. The great majority of authors lay too much stress upon the incident rays, upon which the course followed by the individual rays from the source of illumination to the mirror, and thence to the patient's retina, laboring meanwhile over the incidental refractive error. This latter is of negligible importance to the incident rays and can be dismissed in a word. Its sole function is to convert the theoretic "point" of illumination upon the retina into an area, or region, by virtue of the diffusion circles created, and, as he shows us, this is a factor of neither inconvenience nor instability in his explanation.

H. G. G.

A Further Communication on My Ocular Muscle Tucking or Shortening Operation.

SUFFA, GEORGE A. (*Archives of Ophthalmology*, May, 1912), tells us that since his original article in an earlier publication of the same journal, he has made several advances in the method of performing the operation; has added three new instruments, and combined the myometer and clamp, all of which may be summarized as follows:

In tucking an ocular muscle (1) care should be exercised to preserve its capsular covering. (2) The angle of the tendinous insertion of the muscle should be noted, and the tucking suture put in parallel to it by means of the myometer, so that there shall be no torsion when the suture is tied. (3) The holding ends of the suture should be firmly anchored in the tissues. (4) One millimeter of tucking is to be done for each four prism degrees of error. (5) The suture should be tied with consideration for the circulation and with a square knot.

For the correction of outward deviations: (1) The external rectus should be tenotomized before the tucking suture in the internus is tied. (2) The displacements of the externus should be exactly the same number of millimeters that the internus is shortened. (3) The displaced tendon of the externus should be anchored in its new position by a suture until the healing has taken place.

For the correction of inward deviations: (1) The internal rectus is not to be tenotomized under any circumstances. (2) In order to aid the tucked externus and give the internus a "breaking in," the internus should be stretched.

Measurements of the ocular tendons with the tenometer for the purpose of getting ocular data: (1) In tucking operation measurements are to be made after the muscle has been stripped ready for the myometer. (2) In tenotomy just before the tendon is severed. The external rectus has remarkable recuperative powers, while the internal rectus, per contra, relaxes, as shown by observations of operated cases.

H. G. G.

The Dowd Phosphatic Index in Relation to Disease of the Eye.

CLEMESHA, J. C., Buffalo (*New York Medical Journal*, March 23, 1912), supports the old fashioned but obviously true idea that asthenopia, or eye strain, is sometimes due to

a lack of nerve energy, rather than always to an imbalance of the ocular muscles, which, by the way, may be symptomatic at times. His idea is to "consider the metabolism of the nervous system with certain attempts to measure and regulate nervous energy produced and exerted at various times, and under varying conditions by the human organism." His conclusions are: The phosphatic index measures the amount of nervous energy present in the organism. A high index will note a condition of irritation or a want of adjustment of the nerve cells. A low index shows a lack of nutrition of the nervous organism, a using up of the reserve, and a condition below par. A high index calls for nerve sedatives, valerian, or bromid of gold and arsenic. A low index calls for food, eggs, etc., and the administration of phosphorus and strychnin. The urine should be that passed about ten a. m., the second in the morning. The crystals should be examined for size and quality. In any functional disorder or one accompanied by organic lesions, the phosphatic index is of the greatest value as a guide to treatment. In all cases look to assimilation and correct any intestinal putrefaction shown by an excess of indican.

M. L. F.

Intestinal Sepsis in Ocular Affections.

RISLEY, SAMUEL D., Philadelphia (*Ophthalmology*, January, 1912), reiterates the opinion, expressed in 1889, that the term "senile" as applied to cataract should be eliminated because it throws the emphasis upon the wrong etiology; that the real cause is not primarily senile, but rather a pathologic condition, and should be treated accordingly; that when seen in the incipient stage the opacity of the lens is usually associated with choroidal disease, vitreous changes and other symptoms of impaired nutrition of the ball, local disease of the uveal tract due to previously uncorrected eye-train and disease of the contiguous sinuses; that suitable treatment will often arrest the progress of the condition, or at any rate render the prognosis for operation more hopeful. The treatment to be adopted is guided by a study of the etiologic factors of the choroiditis. We commonly find the symptom complex of intestinal indigestion and autointoxication present; sclerosed arteries, high blood pressure, fluffy, edematous retina, dark, full veins, impaired vision and concentric narrowing of the

field of vision, fluid vitreous with floating opacities. The condition will improve surprisingly after treatment with some of the alkaline earths, as sulphate of magnesia and nitroglycerin for the high blood pressure. Operation should be deferred until these systemic conditions are corrected. What has been said applies also to patients suffering from inflammatory glaucoma. Even in its worst phase, that of hemorrhagic glaucoma, we all know that its hopelessness grows out of the fact that the arterial disease is already so far advanced as to promise a speedily fatal result.

A. F. A.

Ocular Leprosy.

FERNANDEZ, FRANCISCO M., Havana (*Ophthalmology*, January, 1912), says that leprosy is on the increase in Cuba, but its ravages have not yet become alarming. Ocular complications are common and usually progressive. Out of 250 cases seen by the writer, 150 had some eye trouble, and more than 30 had partial or total loss of vision. The eye complications are usually secondary. Eyebrows and eyelashes are absent in nearly every case, conjunctivitis is common, and frequently necrosis and ulceration of the palpebral and orbital tissues follow. Keratitis is frequent and is usually an extension through the corneoscleral junction. It spreads slowly until the whole of the cornea is involved. This inflammation is very painful, and the pain seems to be the most severe that the patient has to bear in this disease. The cornea becomes opaque, and occasionally abscesses form and perforations result. The leucomata in these cases become very white and the cornea thin. The iris becomes inflamed by extension from the uveal tract, the retina, choroid and optic nerve rarely are affected, and the lens may be reached by extension late in the course of the disease.

A. F. A.

The Eye Syndrome of Dementia Praecox. Ocular Signs and Symptoms of Dementia Praecox and Their Significance as Observed in 115 Consecutive Cases.

TYSON, H. H., AND CLARK, L. (*Archives of Ophthalmology*, May, 1912) divide the fundus changes in this class of cases into three groups as follows: (1) Congestion of discs; hyperemia and edema; dilated, dark colored veins; slightly contracted arteries and blurring of the edges of the discs, all

varying in degree. These changes constitute a low grade of perineuritis of the optic nerve. (2) Congestion of the nasal side, with temporal pallor of the discs, dilated veins, contracted arteries. (3) Pallor of discs, dilated veins, contracted arteries. These changes constitute anemia and partial atrophy of the optic nerve. One hundred and nine cases were examined with the ophthalmoscope; 55 were males and 54 females. The ages of the males were from 12 to 47 years, and those of the females were from 13 to 39 years. Coincident with the study of the changes in the papillæ, the pupils were examined in 85 cases; the size varied from $3\frac{1}{2}$ mm. to 7 mm., with an average of $4\frac{77}{85}$ mm., while the average of the control pupils was $3\frac{68}{85}$. An average enlargement of $1\frac{9}{85}$ mm. for dementia præcox over the normal was evident. The light reaction was active in 71 cases and sluggish in 14. Consensual reaction was active in 71 cases and sluggish in 13. Hippus was present in one case. Corneal sensibility was diminished in 69 cases and normal in 17. The visual color fields were examined in 81 cases, and all were found concentrically contracted. The changes in the discs, pupils, visual fields, and corneal sensibility, which, when taken together, constitute the new syndrome, are all in accord with each other. The main contention of the writers is that a fairly constant eye syndrome exists in dementia præcox, and secondly, the best hypothesis for explaining the presence of the same is upon some endogenous or exogenous substance. They believe the first position has been established. From the partial and incomplete nature of the study, the second contention can only be urged as a contributing study to that end.

H. G. G.

Effects of Salvarsan on the Eye.

REESE, ROBERT G., New York (*New York State Journal of Medicine*, July, 1912), pronounces salvarsan to be a powerful symptomatic remedy for the treatment of luetic eye lesions which merits attention, especially in combination with mercury and iodine. Its action is more rapid than that of mercury, but should not replace that valuable agent except in selected cases. It should be given intravenously for quick action and for the comfort of the patient. It should not be given in simple, spinal, noninflammatory atrophy of the optic nerve.

M. L. F.

On the Use of Radium in Ophthalmology.

RYERSON, G. STERLING, Toronto (*Ophthalmology*, January, 1912), reports that if one brings a sufficient quantity of radium in contact with the closed eye, the temple, the vault of the skull or the occiput, a sensation of light will be produced. The radium rays do not act on the retina nor visual purple; the rays have no refracting power, so that no image is thrown on the retina; the Beta rays, the most active, do not reach the retina, being absorbed by the media of the eye, hence we conclude that the radium emanations act by fluorescence of the refractive media of the eye and by direct irritation of the cortical visual center, producing an increase of visual power. The diseases to which radium can be applied successfully are external, of the eyelids, cornea and conjunctiva. It may be applied naked or filtered, but bearing in mind its powerful caustic effect, in all cases except epithelioma it should be filtered through tin, lead or aluminum. Rodent ulcers, angiomas and epitheliomas of the lids yield readily. A case of sarcoma of the brow which melted away under treatment is recorded. Trachoma and pterygium are greatly benefited or cured. Lupus of the conjunctiva and severe corneal ulcers offer promising fields of treatment. The analgesic action of radium has been frequently noted, especially in neuralgias.

A. F. A.

Vaccine Treatment on Ophthalmology.

CLAIBORNE, J. HERBERT, New York (*New York Medical Journal*, June 8, 1912), reports two cases which were apparently cured by injections of staphylococcus pyogenes aureus. One patient was a little girl who had been suffering from successive crops of styes, the other, a man who had recurrent boils in his nose and on the back of his neck.

M. L. F.

ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

(GREAT BRITAIN AND THE ENGLISH COLONIES.)

BY

WALTER R. PARKER, M. D.,

DETROIT.

WM. EVANS BRUNER, M. D.,

CLEVELAND.

NELSON M. BLACK, M. D.,

MILWAUKEE.

EDGAR S. THOMSON, M. D.,

NEW YORK.

AND

W. GORDON M. BYERS, M. D.,

MONTREAL.

Iritis.

ORMAND, ARTHUR W. (*Ophthalmoscope*, June, 1912). gives a dissertation upon iritis which covers the ground very thoroughly, bearing in mind that iritis as a simple distinct entity seldom exists, but that it is rather a part of a general inflammation of the uveal tract.

The anatomy and physiology of the iris is described in detail, and the pathology of iritis briefly stated. The pathologic changes found in iritis are due to enlargement of the vessels both in caliber and length, displacement of the endothelium by a fibrinous exudate which permeates the iris stroma like a sponge, and often overflows into the anterior chamber and

pupil, increased leucocytosis and, in some cases, hemorrhage, especially in septic iritis. The cells present in the exudate are lymphocytes, polymorphonuclear leucocytes, and mast cells.

Symptoms.—These are pain, photophobia and lacrimation, redness of the eye, discoloration of the iris, impaired mobility, and contraction of the pupil and exudation.

Photophobia may be marked, displaying its presence by blepharospasm, and is due to reflex stimulation of the over-sensitive fifth nerve-ending in the iris; possibly by light, but more probably by the contraction of the sphincter muscle or the inflamed condition of the tissues. Lacrimation is probably due to the same cause.

The redness of the eye in iritis is marked by two characteristics: first, it increases in intensity the nearer it is to the cornea; and, secondly, it is of a much deeper red, having more blue in it than in conjunctivitis. The so-called ciliary or circumcorneal injection is due to the engorgement of minute branches of the anterior ciliary arteries which do not perforate but pass forward to the ciliary margin.

The immobility of the iris is due to the congestion of the vessels, the tonic contraction of the sphincter iridis, and to the engorgement of the iris stroma by exudation, and is irrespective of any mechanical adhesion of the iris to the lens.

The exudation may be confined to the stroma of the iris, or may pass to its anterior or posterior surface, or to the pupillary area or anterior chamber; it may be serous, plastic, or purulent. The iris itself becomes much thickened antero-posteriorly, and its delicate striation disappears, owing to the blurring produced by the exudate which fills in the interstices of the stroma. The redness of the dilated vessels mixes with the normal color of the iris and alters the natural tint. The exudation may be so profuse on the anterior surface that it is sometimes seen as a distinct membrane of a grayish color, more or less like a net stretched over the whole or part of the iris. When the exudation overflows into the anterior chamber, the aqueous becomes turbid and the pupil looks milky instead of jet black. If the cells of the exudation are numerous and mixed with fragments of lymph, these may remain suspended in the aqueous and gradually by their weight settle down to the bottom of the chamber, forming hypopyon.

The most characteristic evidence of iritis is the formation of posterior synechiæ, best demonstrated by dilatation of the pupil, when tags of pigmented exudation are clearly visible attached to the anterior surface of the lens.

If the pupil is so bound down to the anterior surface of the lens that all efforts to dilate the pupil are futile, the condition known as "exclusio pupillæ" is produced, which is a serious matter, since the aqueous is prevented from reaching the anterior chamber, and the fluid pent up behind the pupil causes the iris to be bowed forward, producing the so-called "iris bombé," which leads to glaucoma; hence the importance of obtaining a dilated pupil as rapidly as possible when treating iritis.

The duration of an attack varies greatly; about a month in the slighter form to several months in the cases associated with cyclitis.

Etiology.—Iritis may be primary, i. e., due to local or constitutional causes, or secondary to inflammation in the immediate neighborhood. All the commoner varieties of pyogenic organisms or their toxins have been found in association with inflammation of the uveal tract.

Many etiologic factors are undoubted—syphilis, gonorrhea, tubercle, etc.; others are less certain—rheumatism, pyorrhea alveolaris, dyspepsia and the uric acid diathesis.

With regard to syphilis, the iris is attacked both in congenital and acquired syphilis. In congenital syphilis it is rare as a simple manifestation, although of course in association with interstitial keratitis it is very common, since iritis occurs in all but the very slightest cases. In the acquired form it occurs as a secondary manifestation often at the same time as the rash, and before the chancre has disappeared; also as a tertiary symptom many years later, and it is then of a gummatous nature; a large number of the cases of "quiet iritis" are to be placed in the last group.

Gonorrheal iritis does not always manifest itself in a particular form. C. Higgins, in the *Lancet*, some years ago, described a clinical picture of gonorrheal iritis. "The patient, nearly always a man, giving a history of repeated attacks of gonorrhea, painful, often severely so; there is swelling of the iris, generally much photophobia, a strong tendency for adhesions to form, although there is no great amount of exuda-

tion, with much ciliary and conjunctival congestion. There is also a decided inclination to contraction of the pupil, which strongly resists the action of mydriatics, of which there is often a marked intolerance; a tendency to increased tension, a general intractability, rendering treatment most difficult and its results most disappointing."

Tubercle attacks the iris, and, as in other tuberculous affections, its course is marked by great chronicity, slight pain and intractability to treatment. Tubercle affecting the iris may or may not give any distinctive evidence of its nature, and Koch's tuberculin test or von Pirquet's cutaneous reaction should be employed if the diagnosis is doubtful.

Neither traumatism or simple iridectomy wounds show any inflammatory reaction, provided no septic infection takes place.

Iritis is undoubtedly associated at times with a subacute articular malady: this has been thought to be rheumatic in origin, whereas the probability is that there are cases of acute or subacute rheumatoid arthritis: that being, according to modern views, associated with chronic septic infection, often oral in origin. Iritis is so seldom seen in cases of acute rheumatism that it does not seem that the organism responsible for rheumatic fever shows any predilection for uveal tissue. The mouth and teeth are daily becoming more and more recognized as causes of chronic septic poisoning, and that being so, the iris is likely to be attacked, not only by a chronic iritis, but also by acute conditions.

Diabetes is probably more frequently associated with iritis than the published cases would suggest. Clinical evidence supports the fact that every case of iritis is of septic or toxic origin, and may be exogenous—that is, due to an infection introduced into the eye through a wound; or endogenous—that is, conveyed to the eye by the blood stream.

Secondary Iritis.—Iritis may result from septic poisoning obtained from a focus in its immediate proximity, the conjunctiva, cornea, ciliary body, choroid, retina, or sclerotic. It is a very frequent complication of corneal ulcer, especially those suppurative forms of keratitis associated with serpiginous ulcers: the hypopyon then formed being due to inflammatory material derived from the iris and ciliary body.

Treatment.—There are three important points in the treatment of iritis: to keep the pupil as widely dilated as possible,

to search out diligently the "causa causans," and to relieve pain.

The patient in a severe case should be kept in bed, or at least in a warm atmosphere; all stimulants avoided, as well as meat. The bowels are to be kept open by calomel and salines, so that an action is assured twice a day; this is the best, if not the only satisfactory antiseptic. The patient should not be starved, but kept on light nourishing food that is easily digested. If the pain is severe, hot fomentations and diaphoresis should be used, also dionin in increasing strengths, 1 or 2 to 5 per cent solution, instilled into the conjunctival sac.

A useful prescription is the following:

Atropin sulphate	grs. 4
Cocain hydroch.....	grs. 4
Dionin	grs. 12
Aq. distil. ad.....	oz. 1

Sig.—One drop into the eye every three hours until the pupil dilates.

Aspirin 10 to 20 grains, two or three times a day, is very valuable: but when the pain and inflammation are intense, nothing affords so much relief as blood letting and two to four leeches applied to the temple on the affected side.

When there is much exudation, mercury and iodids are useful. In chronic cases, where the inflammatory symptoms have passed away, Turkish baths and mercurial inunctions are useful in helping absorption of the débris left by the acute attack. Subconjunctival injections of salt solution or iodipin also help in clearing up posterior synechiæ and vitreous opacities. Vaccine treatment has been successfully used in tubercle and gonorrhea, and in cases where the iritis is due to a chronic poisoning by a well ascertained microorganism.

Guiacol, either in 3 per cent ointment rubbed in the skin of the lids or subconjunctivally injected, is looked upon by some surgeons as a specific in tuberculous affections of the eye.

Septic material planted within the eye by trauma is best dealt with by freely washing out the anterior chamber with a weak solution of sublimate (1 to 12,000) or normal saline. Afterwards a subconjunctival injection of cyanid of mercury and acoin should be made and dionin dusted over the wound.

In cases of relapsing iritis, where the pupil is not entirely bound down by synechiae, an iridectomy will diminish the number and severity of the attacks, and should always be employed as a therapeutic agent.

W. R. P.

Keratitis as a Cause of Myopia.

WILSON, J. A. (*Ophthalmoscope*, July, 1912), has collected and tabulated a series of 100 consecutive cases of corneal opacities, with a view of investigating their relationship to myopia. Seventy-nine had both eyes affected, the remainder had opacities in one eye only. In some cases the opacities were of long standing, in others more or less recent. In 88 per cent the vision was very bad, incapacitating them from following any occupation necessitating good sight.

Refraction of 200 eyes:

Forty-six per cent had myopic astigmatism, mostly compound; 21 per cent had myopia; 2 per cent had mixed astigmatism; 5 per cent had hypermetropia; 20 per cent had hypermetropic astigmatism; 6 per cent had emmetropia.

This total of nearly 70 per cent myopia averaged a little over 3 D.

By way of comparison, statistics are quoted from the examination of 2,181 scholars, which showed 1.9 per cent of myopia and myopic astigmatism, and 3.5 per cent of mixed astigmatism.

In those cases where there was an isolated small deep opacity, probably the result of an ulcer, there was usually an absence of myopia, but where the opacities were patchy, punctate, or more or less diffuse—conditions the result of general involvement of the cornea—then myopia was usually present. Astigmatism was usually more marked where the opacities were arranged in a band-like manner. The degree of opacity varied from a well-marked leucoma to a faint nebula. There were 21 cases in which opacities appeared in one eye only, and of these 13 were myopic. From the most pronounced cases among these, 10 nebulous eyes totaled 38 diopters of myopia, while 10 nonnebulous eyes showed a total of only 1.5 diopters of myopia. Keratitis is more likely to be followed by myopia when it affects young people than when it affects adults, for several of the cases in adults did not present myopia.

Cases are cited which showed evidence of alteration of the

curvature of the cornea, evidence of yielding at the sclero-corneal junction, and also some evidence of changes at the fundus. Pericorneal alteration involves corneal alteration; broadening of the base of the cornea means lowering of the dome, or flattening of the cornea and uneven basal disturbance means uneven alteration of the cornea. Probably cornea and pericorneal area are both usually affected.

The tension in a series of acute and subacute keratitis was usually low, and myopic conditions were not found in actively affected eyes, suggesting the conclusion that the alteration which produces myopia takes place after this stage has subsided.

If phlyctenular and interstitial keratitis are causes of myopia, this should be kept in view and influence the treatment. These cases should be kept under observation after the acute stage is over, school work relaxed, and an effort made to keep the intraocular pressure low. The probability of recurrence and the danger from neglect of treatment should be impressed upon the parents.

W. R. P.

A Case of Chronic Membranous Conjunctivitis Treated With Vaccines.

DORRILL, E. ARTHUR (*Ophthalmoscope*, June, 1912), reports a case of membranous conjunctivitis of prolonged chronicity with tendency to leave granulation upon the palpebral conjunctiva, which was treated with vaccines. Other points of distinction are its slight infectivity, superficial nature of the membrane, free bleeding from the conjunctival surface after removal of the membrane, and frequent involvement of the cornea and often loss of the eye.

The Klebs-Loeffler bacillus is most frequently found in membranous conjunctivitis, but it rarely lasts more than a few days, while in the chronic cases a streptococcus is usually responsible.

Six cases resembling the one reported are briefly summarized from the literature. In the majority there has been a history of measles, scarlet fever, or whooping cough.

The case recorded is of interest from the presence of an influenza-like bacillus, which reappeared in a relapse a year later; this was mixed with what at first appeared to be a pneumococcus, but on further investigation turned out to be a streptococcus.

After ineffectual treatment locally, a vaccine was made, but being given in apparently too large doses, the condition became worse. It was dropped for a time and resumed again with very small doses. This proved effectual, and on a relapse taking place some months later, it was employed again and led to the disappearance of the membrane in a few days.

Both lacrimal passages were affected with blennorrhoea of both sacs. The cornea of the left eye became infiltrated and sloughed, with resulting gradual shrinking of the eye.

With the disappearance of the membrane protuberant granulations appeared, springing from the conjunctival surface of each lid, which persisted, recurring when excised.

After twenty-six months the condition was little changed, the granulations shrunken somewhat and the discharge less.

"How much benefit, if any, in helping to remove and prevent the membrane from recurring was due to vaccine in this case, it is difficult to say, but that the same organisms appeared in the year-later relapse as were present originally, and that the membrane gave way on both occasions when the vaccine was given in suitable doses, seems in favor of the therapeutic influence of the vaccine."

W. R. P.

A Case of *Rhinosporidium Kinealyi* of the Conjunctiva.

ELLIOT, R. H., AND INGRAM, A. C. (*Ophthalmoscope*, August, 1912), reports a case of *rhinosporidium Kinealyi* of the conjunctiva of five years' standing, in a Mohammedan male, 60 years of age. Examination showed a pendulous semi-circular cutaneous overgrowth, loosely overhanging the upper part of the superior maxillary bone, measuring 20 mm. horizontally in its broadest part, 13 mm. vertically and 9 mm. in thickness. It had a fibrous feel and was not adherent to the deeper structures.

Eversion of the lower lid showed a second mass on the outer two-thirds, of a reddish irregular granular appearance, with a number of white patches on it, which appeared to be retained secretion. Large tortuous vessels could be seen over its surface, and upon pinching up the skin-fold from the outside the palpebral mass could be felt projecting between the folds, thick creamy pus escaping from the follicles.

A third mass was situated close to the inner canthus, elastic and rounded, giving the appearance of containing tense fluid.

The skin is freely movable over it, and it lies in the segment of the orbit, downward and internal to the eye.

The tumors were removed and exhibited the following pathologic structure:

(a) An irregular growth of tough consistency covered by skin, save at its base, consisting of fibrous connective tissue with some irregular proliferation, covered by a somewhat flattened layer of stratified epithelium, bearing hairs. There was one large irregular cystic space, full of granular material, with a wall formed of flattened fibrocellular tissue; also a few small empty spaces which appeared to be dilated lymphatic spaces. The large cyst was larger than rhinosporidial cysts usually are, and had no cuticular wall; it was probably an old blood cyst whose contents had become degenerate. Its origin was probably traumatic and not parasitic.

(b) A conjunctival polypus removed from beneath the cutaneous growth (a). It consisted of fibrous and fibrocellular tissue containing a considerable number of typical cysts of rhinosporidium Kinealyi of all sizes and scattered irregularly through the tissue. The surface of the polypus was covered by an irregular layer of transitional epithelium, and close to the surface were a number of large cyst spaces full of granular material, and lined by an irregular layer of epithelium. Almost all the parasitic cysts were more or less distorted and degenerate.

The mass from the inner and lower portion of the orbit resembled the first in structure, somewhat less fibrous and containing a great many well-formed cysts of rhinosporidium Kinealyi.

A brief report of two more cases of rhinosporidium Kinealyi affecting the conjunctiva is appended by Major H. Kirkpatrick, Madras. Photographs of the microscopic sections of the cysts are shown. W. R. P.

A Case of Retinal Embolism.

HIRD, R. B. (*Ophthalmoscope*, July, 1912), reports a case of retinal embolism in which the embolus could be seen with the ophthalmoscope. The patient, male, aged 31 years, suddenly lost the vision of his right eye. Vigorous rubbing of the eye brought about partial return of sight, but no vision below the horizontal line of vision.

Examination.—Right vision equaled 6/8 and J. 1½ by inclining head downwards and looking upwards. Visual field showed a unilateral horizontal hemianopsia of the right eye, which did not include the fixation point. The fundus showed edema of the upper half of the retina. The superior retinal vessels were empty and devoid of pulsation on pressure of the eyeball; the inferior vessels were quite normal. A round whitish body could be seen in the superior retinal vessel astride the bifurcation into superior temporal and nasal vessels. The left eye was normal. Physical examination demonstrated old endocarditis of the mitral and aortic valves. The progress of the condition was uneventful. Three days later the vision was nearly 6/6, and the field of vision increased considerably in size. The upper half of the disc became pale, but the vessels became larger and pulsation could be observed on digital pressure on the eyeball. The white mass could still be seen in the lumen of the superior vessel three months later.

W. R. P.

ABSTRACTS FROM GERMAN OPHTHALMIC
LITERATURE.

BY

WILLIAM ZENTMAYER, M. D.,

PHILADELPHIA.

ALBERT C. SAUTTER, M. D.,

PHILADELPHIA.

FREDERICK KRAUSS, M. D.,

PHILADELPHIA.

AND

WALDEMAR E. FISCHER, M. D.,

ST. LOUIS.

Concerning Sarcoma of the Choroid.

FUCHS, Vienna (*Graefe's Archiv. für Ophthal.*, Vol. 81, Part 3; Supplement to the article "Concerning Sarcoma of the Choroid," *Graefe's Archiv.*, Vol. 77), after admitting his mistake in questioning the diagnosis in one of the cases reported by de Schweinitz and Shumway in the *Ophthalmic Record*, 1905, and alluding to his paper before the American Ophthalmological Society in New London, 1911, reports the findings in two cases of sarcoma of the choroid followed by necrosis. Although a complete series of sections was obtained and studied in both cases, no living tumor tissue could be found. In these cases, therefore, he claims a spontaneous cure must have occurred. He admits the possibility of metastasis prior to necrosis, but in his own cases this could be excluded.

In the determination of the etiology of a case of atrophy of the globe, factors suggestive of sarcoma are the absence of a

traumatic history and a period of visual impairment without inflammatory signs, followed suddenly by a violent iridocyclitis. When iridocyclitis does occur in retinal detachment and cysticercus, it is less severe, and the first attack seldom destroys vision with ensuing atrophy of the globe.

In doubtful cases the presence of a widely dilated pupil argues in favor of preexisting increased tension, and therefore in favor of sarcoma. Pupillary seclusion with iris bombé never occurs in necrosis; the inflammation in these cases being so severe that the whole posterior surface of the iris becomes glued to the lens. Moreover, the iris is extremely atrophic and the pupillary margin is differentiated with difficulty from the dense pupillary membrane.

He believes many an eye has been enucleated undiagnosed which once harbored a sarcoma. In markedly atrophic cases the histologic diagnosis is difficult. A. C. S.

Histologic Examination of a Case of Blindness Caused by Injection of Arsacetin.

SATTLER, Koenigsberg (*Graefe's Archiv. für Ophthal.*, Vol. 81, Part 3), concludes that the injury to the eye by arsacetin may show itself as a genuine optic nerve atrophy with rapid deterioration of vision uncomplicated with a central scotoma. The histologic findings in one case showed the third neuron principally affected. There was chromatolysis and vacuolation of the ganglion cells, atrophy of the nerve fibers with slight proliferation of the glia. Disturbance of the medullary sheaths was more marked in the nerve than in the tract. The papillomacular bundle was much less affected than the other fiber bundles. A. C. S.

The Senile Changes in the Human Eye.

ATTIAS, G., Munich (*Graefe's Archiv. für Ophthal.*, Vol. 81, Part 3). The article is long and comprehensive and cannot well be abstracted. Considerable space is devoted to the pathology of arcus senilis. From a study of a large series of cases he finds a fatty infiltration of the corneal layers responsible for the arcus senilis. He never found hyaline substance participating in this formation. The presence of fat in corneæ with arcus was demonstrated by various staining methods and by chemical analysis. The neutral fats predominate. A. C. S.

Embryontoxon and Arcus Corneæ Juvenilis.

ATTIAS, G., Munich (*Graefe's Archiv. für Ophthalm.*, Vol. 81, Part 3), considers the arcus juvenilis a probable persistent embryontoxon, a peripheral corneal opacity sometimes observed in the cornea of the newborn. The arcus juvenilis too is probably not a permanent opacity.

He cites five cases of arcus juvenilis, and compares this form with gerontoxon as follows:

1. Arcus senilis occurs either as a complete circle consisting of a larger upper arc and a smaller lower arc, or as a single arc which is always located above. Walter is the only writer who claims the arcus senilis first appears in the lower half of the cornea, a view perhaps the result of mistaking the juvenile arc for cases of incipient arcus senilis.

The juvenile arcus seldom occurs as a complete circle; when it does, the upper portion is the more delicate. It is usually made up of two arcs, an upper inner and a lower external portion. A medial and a lateral arc sometimes occurs. The upper arc is the smaller. When only one arc exists, it is below and may be slightly external or internal.

2. The arcus senilis is sharply differentiated only peripherally, whereas the arcus juvenilis is sharply differentiated centrally and peripherally.

3. The gerontoxon is always bilateral and equally and symmetrically distributed. The arcus juvenilis may be present in only one eye; when it occurs in both eyes, its form and extent may differ in the two eyes.

4. Oblique illumination shows that the arcus juvenilis does not penetrate the corneal tissue as deeply as the gerontoxon.

A. C. S.

Cataract and Atrophic Myotonia.

HOFFMANN, Heidelberg (*Graefe's Archiv. für Ophthalm.*, Vol. 81, Part 3), reports five cases of atrophic myotonia complicated with cataract, and refers to two cases from the literature. He also cites the histories of two families, one reported by Greenfield, in which this association was manifest, not always occurring, however, together in one individual.

He finds between 70 and 80 (including his own unpublished cases) cases of atrophic myotonia in the literature. Eight of these, five hereditary, three sporadic) were associated with unilateral or bilateral cataract.

He divides the cases into three classes: 1, cataract without myotonia; 2, myotonia without cataract; 3, cataract with myotonia.

He thinks myotonia and cataract probably develop independently of each other from a diseased inherited predisposition. In Thomsen's disease, congenital myotonia without atrophy, cataract apparently does not occur.

A. C. S.

Glaucoma Following Cataract Extraction and Discission.

STOELTING, Hanover (*Graefe's Archiv. für Ophthal.*, Vol. 81, Part 3), reviews the literature, referring frequently to Dalen's contributions. A study of these cases and personal observations suggest the following varieties of glaucoma following cataract operation: 1. Glaucoma due to incarceration of the capsule in the wound, resulting in (a) serous iritis, (b) chronic inflammatory glaucoma. 2. Glaucoma due to immigration of epithelium through the wound to the iris. 3. Glaucoma after discission.

As an example of the first variety he publishes the clinical and pathologic findings in one of his cases. There was associated serous iritis.

Group (b) includes those cases occurring later after operation, which cases resemble the clinical picture of chronic inflammatory glaucoma. The majority of cases come under this heading.

Increased tension seems to follow discission after simple extraction oftener than when performed after a combined extraction. These discission glaucomas, however, are seldom followed by serious consequences. They have been attributed to swelling of the lens and traction on the ciliary processes by the luxated capsule (v. Graefe), and to vasomotor irritation with resulting hypersecretion (Bowman).

While glaucoma is more frequent after discission in simple extraction than after the same operation in combined extraction, it is an extremely rare complication, and when it does occur is of a benign nature. One should, therefore, not be influenced in favor of the combined operation, which is more apt to be followed by glaucoma and by glaucoma of a serious variety.

He questions the importance of iris prolapse in the etiology of postoperative glaucoma, referring to Hölth's investigations

and to Schweigger in support of this view. The incarceration of the capsule is the important factor. This is often favored by the spatula maneuver which attempts reposition of the sphincter angles. This inclusion leads to nerve irritation and to hypersecretion.

Extraction should be performed without iridectomy: if iridectomy is absolutely necessary, it should take place after the removal of the lens; or, better still, extraction should be followed by a small peripheral iridectomy. He favors scopolamin-morphin anesthesia.

A. C. S.

Concerning the Structure and Development of the Zonula of Zinn.

CARLINI, V., Livorno (*Graefe's Archiv. für Ophthalm.*, Vol. 82, Part 1), ends his comprehensive article with the following conclusions:

1. The zonula of Zinn is no membrane-like formation, but a complicated system of fibers arising from the surface of the retina ciliaris, most of the fibers inserting in the lens capsule. The space traversed by the fibers is part of the posterior chamber and is filled with ocular fluid.

2. The posterior chamber is bounded in front by the iris, internally by the lens capsule, externally by the retina ciliaris, behind by the vitreous. The zonula fibers divide the chamber into three portions: 1, an anterior portion without fibers (pre-zonular space of Czermak, or real posterior chamber); 2, a portion traversed by zonula fibers (zonular space of Czermak, canal of Petit of some authors, Hannover's canal); 3, a facultative portion behind the zonula fibers (postzonular space, canal of Petit of some authors).

3. In the structure of the zonula he differentiates, with Garnier, principal and auxiliary fibers. The principal fibers arise from the orbiculus ciliaris and the ciliary processes, and from three main bundles (anterior, middle, and posterior bundle of Salzmann), which insert into the lens capsule. They correspond to the fibræ orbiculo and ciliocapsulares of Czermak. The auxiliary fibers are of two varieties: those which strengthen the principal fibers, and those which connect more or less distant portions of the retina ciliaris. The latter correspond to the fibræ orbiculociliares and fibræ inter- and intraciliares of Czermak, and the association fibers of Terrien.

4. The zonula fibers for the most part run in a meridional

direction. However, circular fibers also exist (Ulrich, Arnold, Claëys, Berger, Salzmann).

5. The zonula fibers decussate before reaching the capsule, the fibers arising posteriorly from the orbiculus ciliaris and ciliary depressions inserting into the anterior surface of the lens, the fibers coming from in front of the processes going to the equator and posterior lens surface. The decussation, however, is only partial, some fibers passing directly from the anterior and posterior portions of the retina ciliaris to the anterior and posterior lens capsule respectively.

6. The zonula fibers are colorless, straight, of glassy appearance, and contain no nucleus. The stronger fibers result from a coalescence of finer fibers; the delicate fibers which undergo no further division are the primitive fibrillæ. Chemically the zonula fibers resemble elastic fibers, but they lack the resisting capacity of elastic fibers. The zonula fibers exhibit no characteristic staining qualities. Nuclear stains are not accepted. However, they take the elastic fiber stain (orcein—Unna, Taenzer, Livini; and resorcin-fuchsin—Weigert) but not to the degree observed in the intima of arteries. They also stain by Weigert's neuroglia method, Mueller's fibers remaining unstained.

The zonula fiber must, therefore, be regarded as a special variety of fiber, although resembling the elastic and neuroglia fiber chemically and in staining qualities.

7. The retina ciliaris (*pars ciliaris retinæ*) extends from the ora serrata to the iridociliary angle, and consists of two layers of cells, an outer pigmented, and an inner unpigmented. The external layer is the direct continuation of the pigmented layer of the retina. The inner corresponds to the nine remaining layers of the physiologic retina. Both layers consist exclusively of cells, of elements entirely homogeneous.

Neither nucleated supporting fibers (as Berger asserts), nor Terrien's anuclear fiber structure occur in either layer.

The lamina vitreas of the choroid continues beyond the ora serrata and forms the vitreous membrane of the ciliary body, or external vitreous membrane. It is a fibrillary structure representing a condensation of the supporting connective tissue elements.

8. The lamina vitrea interna Bruecki (hyaloid membrane of the *pars ciliaris retinæ*) is the direct continuation of the limitans interna retinæ.

9. By far the great majority of zonula fibers originate from the pars ciliaris retinae. The fibers can be followed only as far as the lamina vitrea interna, which must, therefore, be regarded as the real place of origin. A few finer fibers arise from the vitreous.

10. The zonula fibers are seen just in front of the ora serrata with the first ciliary epithelial cells, becoming more numerous in the direction of the ciliary processes. In the most anterior portion of the pars ciliaris their number decreases, and at the summit of the ciliary processes they have practically disappeared.

11. The posterior boundary of the zonula repeats the serrated form of the ora serrata. The anterior border of the zonula in the adult coincides with the inner edge of the ciliary body (viz., the line corresponding to the greatest elevation of the ciliary body above the level of the inner surface of the sclera); in the newborn it corresponds to the iridociliary angle, from which also zonula fibers arise.

12. The zonula fibers arise from the orbiculus ciliaris in its whole extent and from the bottom of the ciliary valleys; no fibers spring from the sides and summits of the processes. Occasionally a few stray fibers are seen arising from near the base of the processes.

13. The vitreous is separated anteriorly from the zonula ciliaris by the anterior boundary layer; posteriorly from the internal limiting membrane of the retina by the posterior boundary layer, a layer less dense and less homogeneous than the anterior boundary layer. A hyaloid membrane does not exist. The only membrane which is situated between the retina and vitreous stops at the ora serrata, stands in close relationship to Mueller's fibers, and may justly be designated the internal limiting layer of the retina.

14. The zonula fibers break up into primitive fibrillae prior to their insertion into the lens capsule. The anterior and posterior fibers divide gradually after they have reached the capsule, whereas the equatorial fibers divide into brush like bundles before reaching the capsule.

15. The zonula fibers do not penetrate the capsule, but fuse only with the external surface. Their offshoots reach only the uppermost lamella of the capsule (Berger's zonula lamella, Retzius' pericapsular membrane), upon which they course a relatively long distance.

16. The equator of the lens is irregularly curved, showing a number of processes and depressions; the former being joined to the brush like fiber bundles. The uneven equatorial contour must, therefore, be regarded as the result of the insertion of the zonula fibers.

17. No difference exists between the cellular elements of the vitreous and zonular space; all being migratory cells of mesodermal origin.

18. The zonula is developed from the anterior portion of the vitreous. In the hyaloid tissue between the ciliary body and the lens a system of delicate connecting fibers appears at about the end of the fourth month of intrauterine life. These fibrillæ are at first extremely delicate and often insert into the capillary vessels of the membranous lens capsule. The true vitreous gradually becomes differentiated from the zonular space anteriorly. This is followed by absorption of the remaining hyaloid tissue and vessels of the vascular membrane in the zonular space, leaving only the zonula fibers.

19. The zonula is a modified portion of the vitreous, organized for a particular physiologic purpose. Whether the vitreous is of mesodermal origin (Schoeler, Kessler, Koelliker, Schwalbe, Hertwig, Schultze, Retzius, Czermak, Cirincione) or of ectodermal origin (Tornatola, Rabl, Fischel, Addario, Haemers, Wolfrum), one thing is certain, viz., that the zonula embryologically and anatomically belongs to the vitreous and not to the retina. Etiologically zonula and vitreous are very closely related.

A. C. S.

Concerning the Occurrence of Lipoid Substances in the Eye. A Contribution to the Knowledge of Retinitis Albuminurica.

GINSBERG, S., Berlin (*Graefe's Archiv. für Ophthal.*, Vol. 82, Part 1), submits conclusions based upon the histologic examination of fifteen eyes in the advanced stages of albuminuric retinitis, these conclusions being in part in accord with the findings of previous investigators, especially with those of Lauber and Adamuek.

In spite of the advanced changes in these eyes, there were no or only slight changes in the retinal vessels, proving the unimportance of vessel changes in the etiology of albuminuric retinitis, a view maintained by Kunz, Schieck, Leber, Lauber and Adamuek.

Furthermore, there were no indications of a disturbance in the retinal circulation (thrombosis, etc.), which is at variance with Leber's findings.

The retinal changes consisted in edema, serofibrinous exudation and lipid radiation of the retina. Hemorrhages and aggregations of varicose nerve fibers generally coexisted; invasion of retinal pigment was a rare complication.

In extensive white discoloration of the apparently thickened retina there was nearly always subretinal exudation. The white or grayish white patches seen with the ophthalmoscope were found to be due to exudate masses, sometimes to collections of varicose nerve fibers.

The lipid cells were usually too small or too scattered to have permitted of their discovery with the ophthalmoscope.

His investigations add further support to the view which holds that the white patches in the retina may be of diverse etiology, explaining the occurrence of the macular star in other affections besides albuminuric retinitis, for instance in choked disc; the peculiar shape being determined by the anatomic arrangement of Henle's fibers. The nature of the deposited substance, whether fibrin, fat, lipid, etc., cannot be determined with the ophthalmoscope.

The pathologic substance found in albuminuric retinitis, pernicious anemia and other pathologic states of the retina, generally consisted of anisotropes, lipoids demonstrable by Ciaccio's method (for the technic the original article should be consulted), with slight amounts of neutral fats. The lipid was contained principally in the protoplasm of the retinal cells, in Mueller's fibers, between retinal elements and between the swollen fiber fragments in the varicose nerve fiber regions. Whether the extracellular substance is formed intracellular and then extruded perhaps with disintegration of the cell, or whether it is formed from the tissue fluids, he leaves an open question.

The pigment molecules, often surrounding fat globules, to which Leber calls attention, were rarely seen in the author's cases.

The lipid in the cell indicates a disturbance in the cellular metabolism. Increased amount of fat or lipid in the blood stream is not a necessary adjunct, since these substances are found in eyes of otherwise healthy individuals. This disturb-

ance is not necessarily irreparable or the cause of grave functional disturbances, as shown by a number of retinal elements full of lipoid but with normal nucleus.

Experimental investigations, including ligation of the ureters, injection of urea, etc., seem to attribute the retinal lesions to toxins formed in the kidney.

In the choroid was found small cell infiltration of the stroma, also fat (rarely lipoid) in the stroma cells, especially in the chromatophores and in the intravascular granular cells.

The changes in the vessels were pronounced, the intima being chiefly affected, hyaline changes predominating. The condition is described as an endarteritis proliferans, the new formed tissue soon undergoing swelling with disappearance of the cells, often exhibiting hyaline metamorphosis and lipoidosis. New formation and degeneration of tissue occurred side by side.

These vascular changes in the choroid cannot be considered a part of a general ocular angiosclerosis, since the other ocular vessels were normal. This is in accord with Leber's findings. And inasmuch as choroidal veins and capillaries showed few if any changes, primary disease of the choroidal arteries must be assumed, the probable cause being some toxic agent.

Why only the choroidal arteries show these changes, he is unable to say. The elective affinity of toxins for certain tissues or organs, however, is well known, and further biologic investigations along lines followed by zur Nedden are to be desired.

A. C. S.

ABSTRACTS FROM FRENCH OPHTHALMIC LITERATURE.

BY

M. W. FREDERICK, M. D.,

SAN FRANCISCO.

AND

JESSE S. WYLER, M. D.,

CINCINNATI.

Voluntary Nystagmus.

WEEKERS, L., Liege (Le nystagmus volontaire, *Archives d'Ophthalmologie*, Vol. XXXII, No. 2, February, 1912, p. 86), describes a case of this rare condition. A young man, 20 years old, about to be drafted for the army, wanted his eyes examined to determine whether he could escape service on account of a trembling of the eyes. He had first caused this "dancing of the eyes" at the age of 7 or 8, and had since provoked at will, whenever he wished to satisfy himself that he was still able to do it. The movements could be started and stopped at will, whenever he was invited to provoke them. The movements were horizontal, sharp, and rapid, twenty to thirty in ten seconds. During the nystagmus there was marked contraction of the pupil, the pupil assuming a markedly oval shape, with the long axis vertical. The rapidity of the movements precluded the determination of a possible hippus. The moment the movements ceased the pupil again became round. Slight spasmodic contractions of the lids were also noted. In order to start the nystagmus the patient concentrated his mind on his eyes; this he could not do over a long time without causing himself great fatigue. During the nystagmus there is no deviation of the eyes. The eyes are generally in the primary position, but nystagmus is possible in all positions except the extremes. It can also be produced when the eyes are closed. During the nystagmus the vision is low-

ered, objects appear deformed. After a few minutes of nystagmus the patient experiences vertigo, from which, however, he quickly recovers. This patient has never had involuntary nystagmus; his vision is normal, and he is an emmetrope. There is no strabismus, no insufficiency, nor muscular paresis. The amplitude of movements is normal, and there is no diplopia, not even during the nystagmus. Family history and general health excellent.

Then follow the histories of two other cases in which the vision was normal, and in which there was no history of involuntary nystagmus. These are followed by the histories of four cases in which there was either lowered vision or a previous history of involuntary nystagmus. In all cases the voluntary nystagmus was horizontal.

Weekers does not consider this voluntary nystagmus an example of voluntary inhibition of the cerebral centers, but as a manifestation of the nervous excitation of the supranuclear centers for the eye movements.

M. W. F.

Mixed Tumor of the Accessory Lacrimal Gland.

DE LAPERSONNE, Paris (Tumeur mixte de la glande lacrymale accessoire. *Archives d'Ophthalmologie*, Vol. XXXII, July, 1912, p. 401), adds another tumor of this variety to those already described by Mendez, Van Duyse, and others. The tumor occurred in a man aged 36. It had increased very slowly during seven or eight years. There had been no pain nor interference with sight. The tumor was removed under chloroform anesthesia through an incision over the outer canthus, and proved to be a mixed tumor of myxomatous and cartilaginous tissue enclosing the lacrimal gland, but showing an absence of osseous elements. The motility of the eye and the vision were in no way interfered with by the operation. The article is well illustrated with trichrome reproductions of autochrome microphotographs.

M. W. F.

Ocular Tuberculosis and Its Treatment.

ABADIE, CHARLES (De la tuberculose oculaire et de son traitement, *Archives d'Ophthalmologie*, Vol. XXXII, July, 1912, p. 406), notes the great increase of ocular tuberculosis in Paris, and again commends his medical treatment of this condition. The treatment consists in the exhibition of thirty to

forty drops of iodogenol a day, and the rubbing into the surface of one to two soup-spoonfuls of guaiacolated cod liver oil (cod liver oil, 120.0; guaiacol, 15.0; essence of citronella, 4.0). In addition the patient is to eat 60 to 100 grams of raw beef daily, or, if the patient is in good financial circumstances, muscular juice. He considers iodogenol superior to the other iodine preparations, because it is without unpleasant odor and is better tolerated by the stomach, which is of great moment, as the treatment of the tuberculous conditions extends over a long period of time.

The good results often obtained in the beginning by treating these patients by mercurial injections can be accounted for by the weakening of the virulence of the tubercle bacillus by the contact with mercury. This improvement, however, is but temporary, and if the mercurial injections are continued the situation becomes worse.

In the cases of mixed dyscrasia, where both tuberculosis and inherited syphilis underlie the eye condition, both modes of treatment should be employed, and an illustration is given in the person of a woman aged 40, whose right eye had been enucleated for a malignant iridochoroiditis which had resisted all treatment. The left eye becoming affected, she was sent to Abadie, who saw a fine vascular arborization of the iris, and gave her the mixed treatment with a good, permanent result.

Of late Abadie has been treating a number of these tuberculous patients with tuberculin. In France the only available tuberculin is that furnished by the Pasteur Institute and that of Calmette. With these he has had very satisfactory results. In spite of large dosage he has never been obliged to suspend the treatment on account of local reaction. All surgical intervention should be rigidly abstained from once the medicinal treatment has been instituted.

M. W. F.

Pseudosympathetic Ocular Neuritis.

WEEKERS, L., Liege (*La névrose pseudo-sympathique oculaire*, *Archives d'Ophthalmologie*, Vol. XXXII, July, 1912, p. 409), pleads for a better understanding of sympathetic irritation, and takes the profession to task for enucleating eyes with useful vision, on account of a mistake in diagnosis. He gives four cases in point, which are worth reporting a little more at length.

Case 1 was a coal miner, aged 33, who had lost his left eye a year previously as the result of a blow from a flying rock. Three months after the accident he tried to resume his work, but was so much annoyed by poor vision, flashing lights, headache and dizziness that he was frequently obliged to quit his work. The left eye is atrophic, tension low, iris adherent to corneal scar, no perception of light, no signs of irritation, not sensitive to pressure. The right eye shows a moderate amount of blepharospasm and photophobia. Vision equals $5/36$. The field for form is strongly contracted, the colors recognized at fixation point only.

There was no reason for malingering, as the patient did not claim damages. A diagnosis of sympathetic amblyopia seemed obvious. A searching examination, however, revealed the presence of corneal insensibility in both eyes, abolition of the pharyngeal reflex, exaggerated knee jerks, hemianesthesia and hemianalgesia of the left side of the face and scalp, anosmia and agusia left, and a zone of intercostal anesthesia. The general condition of the patient is good, his family history negative, with the exception of a neurasthenic brother. The treatment was directed towards the neurosis, and the patient advised change of occupation. In two months he was entirely cured, and has remained so at the end of eight months.

The second case was that of a teamster aged 36, who presented himself in 1907 with an immense serpiginous ulcer of the left cornea, with hypopyon and beginning panophthalmitis. Incision according to Saemisch, atrophy of the globe. The patient complained six weeks later of lessening vision in the right eye; he had vision equaling $5/12$, not improved by lenses. The eye presented no signs of inflammation. Three months later the vision had dropped to counting fingers at four meters, the photophobia and tearing were severe, field for form limited in all directions, no color perception. Fundus normal, no abuse of alcohol or tobacco. The patient would not consent to the enucleation of the stump, in which, however, there were no signs of irritation. Four years later the patient again appeared, stating that he had been unable to work since his accident, the slightest exertion causing him severe headache and dizziness. He had been treated unsuccessfully by a number of physicians in the meantime. The fundus was still normal, the vision varying between hand movements at 25 cen-

timeters, and counting fingers at 1.50 meters. The field for form is limited on the temporal side; colors recognized at the point of fixation only. No irritation in the stump. Hyperesthesia of the face, exaggerated knee jerks, diminished corneal sensibility. General condition good. Treated for ocular neurosis; in two days the vision of the right eye had risen to normal. The patient was very irritable, fought with the attendants, and left the hospital against the wish of the physician.

The third case was a man aged 47, formerly worker in metals, now a mason. In consequence of a blow he had lost the right eye seven years previously, and had noticed an irritation in the left eye every once in a while. He complained of phosphenes, lowered vision, dizziness, and frequent headaches. Both lids and the bulbar conjunctiva of the right eye were markedly congested, the globe in a good state of preservation, showing an iridodialysis on the nasal side. The media all clear, perception of light with faulty projection. No steel shown by sideroscope. The left eye showed a strong follicular conjunctivitis, the vision varying from $1/5$ to $1/12$. The field is sometimes slightly narrowed, sometimes tubular. The pharyngeal reflex was abolished, and anesthetic areas were found on face, trunk and limbs. Local treatment of the conjunctivitis and general treatment of the neuritis brought gradual, although slow, improvement; in four months the vision and field had become normal and the patient had returned to his work.

The fourth case, a quarryman, aged 51, had undergone an enucleation of the left eye as the consequence of an explosion four years ago. Since then he had found it impossible to work more than a few days at a time on account of the headache and dizziness, blurring of sight, and scintillation, especially when he stooped. The left socket was badly neglected, full of pus; no prothesis worn. No nodes or pain from pressure in socket. The right shows nothing pathologic. Nevertheless, the vision is $1/3$, the field concentrically contracted, the field for red highly reduced, blue and green confused. Simulation tests produced no results. This patient was not treated by Weckers, but he thinks he belonged in the same class as the three preceding patients.

In virtue of these and similar observations, Weckers thinks

himself justified in establishing a "pseudosympathetic ocular neurosis," which is to replace in many instances the loosely made diagnosis of sympathetic irritation. This sympathetic irritation is supposed to proceed from a noxa conveyed along the ciliary nerves, but Weekers says that is purely a hypothesis, and that the success sometimes obtained by dividing the ciliary nerves is due to the moral impression produced on a patient suffering from a mental and not from a physical disorder. He is very skeptical about the ordinary view taken of sympathetic irritation, as he has seen the symptoms produced in eyes that had been quiet for a long time by the simplest accidents, such as tobacco ashes blown onto the stump, or a slight corneal erosion, a mild trauma, a foreign body in the conjunctival sac, etc. In these cases the symptoms of sympathetic irritation vanish after the instillation of cocain, just as they often do when the exciter is kept closed. He thinks that to establish the diagnosis of sympathetic irritation there should be signs of irritation in the exciter, tenderness on pressure, painful nodes or granulations in the stump, if the eye has been removed. Where these are wanting, and the general signs of neurosis present, treatment should be directed to the general neurosis.

M. W. F.

Diphtheritic Paralysis of Both External Recti Cured by Serotherapy.

TERRIEN, F. (Paralysie des deux droits externes d'origine diphthérique: traitement par la sérothérapie. Guérison. *Archives d'Ophthalmologie*, Vol. XXXII. February, 1912, p. 106), reports another of the rather unusual cases of partial paralysis of both external recti in a child of 5½ years. Six weeks previously the child had a mild attack of pharyngeal diphtheria, which yielded readily to an injection of antidiphtheritic serum. Six weeks later the voice became nasal, and nine days later the convergence and diplopia appeared. Forty ccm. of antidiphtheritic serum were injected under the skin of the abdomen. There was no reaction, and no results were seen for three days, when it was found that the paresis of the external recti had vanished during the night; the paresis of the soft palate disappeared three days later. According to Terrien, Comby has injected as much as 230 ccm. of the serum.

M. W. F.

Radical Operation for the Cure of Trichiasis and Entropion of Both Lids.

CHRONIS, JR., Smyrna (Une opération radicale pour la guérison du trichiasis et de l'entropion des deux paupières, *Archives d'Ophthalmologie*, Vol. XXXII, February, 1912, p. 100), gives a description of his father's operation, which consists in a canthoplasty, an incision into the skin 3 millimeters from the margin, the removal of the palpebral and Horner's muscles, and the removal of successive layers of the tarsus until a deep furrow has been made. The skin above the margin is then sewed to the tarsoorbital fascia, and the skin is allowed to unite by secondary intention. The final step consists in an intermarginal incision one millimeter deep just behind the cilia. The question of priority between Chronis and Elephtheriades would hardly interest our readers. M. W. F.

Injection of Sterilized Air Into the Vitreous Body for Detached Retina.

ROHMER, Nancy (Effets des injections d'air stérilisé dans le vitré contre le décollement de la rétine, *Archives d'Ophthalmologie*, Vol. XXXII, May, 1912, p. 357), gives his results in seven cases, most of whom were myopes of high degree. His results do not warrant imitation, as the effects produced were of the most temporary character. In one case only, and that a nonmyopic traumatic case, was the retina still attached at the end of four months. As to the technic, Rohmer uses a glass syringe with an iridoplatinum needle; the needle is brought to a glow in a spirit lamp, and the air aspirated through the needle, thus insuring its sterility. Rohmer advises that the needle be introduced through the sclera at a point opposite the detachment, and then shoved through the vitreous far enough to lacerate the retina overlying the fluid deposit. The sub-retinal effusion is then tapped by thrusting a Graefe knife into it and allowing it to escape. Under a pressure varying from little to 300 grams about a cubic centimeter of air is injected into the vitreous. The resultant pain is very slight and the air disappears in twenty-four hours. The injections may be repeated without danger, as long as the pressure and time of injection (three to six seconds) are not excessive. M. W. F.

ABSTRACTS FROM SPANISH OPHTHALMIC LITERATURE.

BY

WILLIAM H. CRISP, M. D.,

DENVER,

New Schedule of Ocular Disabilities for Entrance Into Spanish Army.

MEXACHO, M., Barcelona (*Archivos de Oftalmologia*, April, 1912). This rather lengthy paper is likely to be of interest only to military surgeons. It is suggested that the normal visual acuity of each eye should be represented by the number 10, and the normal visual acuity of the two eyes as 20; and that individuals possessing, without correction, an acuity of 6/20 in one eye only, or a total of 6/20 obtained by adding together the acuity of each separate eye, or a similar total of 8/20 after correction, should be regarded as able for service in the army. Those whose binocular visual acuity is lower than 10, or who have only a monocular visual field, should be used in the auxiliary arms of the service. Men whose myopia, hyperopia, or astigmatism exceeds 5. D. should be excluded.

Ophthalmoscopic Appearances Which May Simulate Optic Neuritis.

CHACON, A., Mexico (*Anales de Oftalmologia*, April, 1912). Congestion of the optic disc is frequently due to eye strain, and may also arise from inflammatory processes of the anterior segment of the eye, conjunctivitis, iritis, cyclitis, etc., as well as from the irritation produced by a foreign body in the cornea. When the retina and choroid are congested the disc is similarly affected. As the vessels which nourish the disc are derived from the choroidal circulation, congestion occurring in eye strain arises from the choroid. The normal redness of the disc varies in different individuals, and pallor of the optic disc does not always justify a diagnosis of atro-

phy. In such cases the visual acuity, visual field, and tests of the color fields must decide. Cloudiness of the vitreous may simulate optic neuritis, but the caliber of the vessels is likely to remain unaltered in such cases, and the blurring of lines will extend to the rest of the fundus. A so-called pseudo-neuritis may exist in normal eyes or those presenting merely an anomaly of refraction. The disc may not only appear obscured in outline, but may protrude. Finally, care should be taken not to confuse with an optic neuritis the indistinctness of the fundus due to the presence of astigmatism.

Duboisin Preferable to Atropin.

SANTOS FERNANDEZ, J., Havana (*Anales de Oftalmologia*, April, 1912).—For twenty-five years the author has used duboisin in preference to atropin. As regards mydriasis, and beneficent action on most of the inflammatory conditions of the eye, the properties of the two drugs are equal. But the toxic action of duboisin is less marked and less frequent than that of atropin. Hence duboisin should be used, especially in children, in preference to atropin, although the price of the former drug is a good deal higher than that of the latter. The chief value of the essay is perhaps to be found in an exhaustive bibliography of the subject which accompanies it.

Iridokeratitis Treated With Koch's Old Tuberculin.

CAMPOS, EDILBERTO, AND TOURINHO, ALVARO, Rio Janeiro (*Anales de Oftalmologia*, May, 1912). A soldier, aged 22 years, had had ocular trouble for between two and three years. The left eye became worse in November, 1910, in consequence of a severe contusion. He entered the hospital two months later. Although the Wassermann reaction was positive, anti-syphilitic treatment produced practically no result. In July, 1911, ophthalmologic examination showed an adherent iris, a pupil much contracted and covered with exudate, and dense infiltration of the cornea. Vision was of hand movements at 30 or 40 cm. The general condition of the patient suggested the presence of tuberculosis, although no definite physical signs were discovered. Tuberculin treatment was therefore begun according to the method recommended by Schoeler. This merely aims to simplify the use of tuberculin by workers who do not handle many cases, and consists essentially in

the use at each injection of 1 cc. of a solution of tuberculin in gradually increasing strength. At the first injection one drop of old tuberculin (Höchst) is dissolved in 40 cc. of boric acid solution, and of this solution 1 cc. is again diluted with 40 cc. of physiologic salt solution. Of this final solution 1 cc. is used for the injection. For succeeding injections the drop of old tuberculin is mixed with diminishing amounts of the diluents, the injection dose of 1 cc. of solution being maintained. In the authors' case there was a gradual reduction of the inflammation of the eye and a corresponding improvement of vision, the patient being finally discharged at his own request when vision had reached almost $\frac{1}{2}$. The largest and final dose contained two drops of old tuberculin. The course of treatment lasted about ten weeks, and twenty-four injections were given.

Leproma of Iris Cured by Radiography.

GONZALEZ, JOSE DE J., LEON, Mexico (*Anales de Oftalmologia*, June, 1912). The patient, a man of 43 years, who presented leprosy lesions in other parts of the body, came complaining of an inflammation of the left eye. The pupil was contracted and occupied by an abundant exudate; and on the sphincter margin of the iris was a swelling two or three millimeters in diameter, of a bright yellow color. Visual acuity was less than 1/100. A diagnosis of syphilis being excluded, the growth was regarded as leprosy in character. In view of the granulomatous nature of leprosy, and of the fact that the X-rays have a marked action on this sort of new tissue, the eye was treated with the rays at three sittings in December, 1911. On the same and some other occasions the rays were also applied to the most marked cutaneous lesions of the body, including ulcerations. The three applications to the eye were followed by a marked lessening in size of the leprosy, scarcely any trace of which was left by the latter part of March. The cutaneous leprosy diminished in size, and all the ulcerated areas of the skin became cicatrized.

Tolerance of the Vitreous for the Lens as an Indication for Reclination in Selected Cases.

DE OBARRIO, P., San Francisco (*Anales de Oftalmologia*, June, 1912), first cites a group of cases in which accidental reclination of the lens into the vitreous was well tolerated. In the first case the lens stayed in the vitreous for seventeen

years without producing any complication, and the vision of the affected eye with correcting sphere was 20/30. In the second case, one of cataract due to a fall on the head, an attempt to remove the tremulous lens resulted in escape of fluid vitreous, and also in the dropping back of the lens into the vitreous chamber. The eye, however, made a normal recovery, and obtained a corrected vision of 20/30. The other eye of the same patient, which had also become cataractous along with the first, subsequently received a blow from a baseball which dislocated its lens back into the vitreous, and obtained similar vision. The case was observed for nine years after luxation of the lenses, and the patient had suffered no inconvenience during that time. On the basis of these observations the author intentionally reclinated the lens in each eye of a case of traumatic cataract, making a small corneal opening near the limbus and depressing the lens with the tip of a strabismus hook. This patient also obtained a corrected vision of 20/30. Two similar cases are referred to as having been equally satisfactory.

SOCIETY PROCEEDINGS.

BY

T. B. HOLLOWAY, M. D.,

PHILADELPHIA.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Meeting of April 20, 1912. Dr. George F. Libby presiding.

Extensive Corneal Opacity.

Dr. David A. Strickler presented a case of extensive corneal opacity following a corneal ulcer, with a view to obtaining opinions as to best mode of treatment.

Discussion.—Dr. Walker thought there was more or less keratitis of an interstitial nature going on at present. Would use hot applications, solution of dionin, and alteratives.

Dr. Hilliard would use the dionin in powdered form and give potassium iodid internally.

Dr. Coover would perform a peridectomy, as some blood vessels had already formed, and then treat with iodin.

Dr. Jackson did not think there was any active keratitis and would perform an iridectomy.

Bilateral Posterior Polar Cataract.

Dr. H. R. Stilwell presented an adult with bilateral posterior polar cataract and slight choroidal changes. The patient was unable to carry on his present work, and he was presented for suggestions as to treatment.

Discussion.—Dr. Neepier suggested a mild mydriatic, such as euphthalmin, to be used regularly by the patient, unless contraindications arose. He had two inoperable cases on weak homatropin solution.

**Two Cases of Gummata of the Iris and One of Plastic Iritis
Treated With Salvarsan.**

Dr. David H. Coover reported the histories of two cases of gummata of the iris and one of plastic iritis treated successfully with salvarsan.

Case 1.—Mrs. G., aged 55 years, widow. Gave no history of a primary lesion. Right eye began to trouble her about the middle of March, 1912. First seen April 7, 1912, at which time examination showed a hazy cornea, pupil contracted and movement sluggish; marked ciliary congestion; slight tenderness on palpation; iris swollen and of a muddy color. On the superior and outer quadrant of the iris, near the ciliary border, a gummi 3 mm. in diameter was distinctly seen. Patient reported having had similar trouble in both eyes two years ago. Was taking no medicine. Wassermann positive. April 9, 1912, salvarsan was given intravenously. The patient complained of feeling very uncomfortable for twelve hours following the injection. Pain and redness increased in the eye and lasted during the entire period. From this time on the pupil was more easily dilated with atropin and there was a continual improvement. Vision increased from fingers to 6/40, and at the end of two weeks the gummi had entirely disappeared.

Case 2.—Miss M., aged 25 years. Gave no history of a primary lesion. About November 1, 1911, she had marked secondary symptoms of lues, skin rash, falling out of the hair, slight temperature, and marked anemia. The following treatment was given her by her family physician: Mercury hypodermically once daily, sodium cacodylate twice a week, and Bland's pills. The treatment was continued during November, December and January. During the latter part of January she developed trouble in the left eye. At this time examination revealed a plastic iritis with vitreous opacities. Atropin and daily mercurial inunctions were ordered, but the eye remained irritable. The patient was not seen again until April 1st, at which time she had three distinct gummata on the pupillary edge of the iris, and vision was reduced to light perception. Salvarsan was advised and given intravenously on April 3rd. The next day the eye was more congested and somewhat painful. These symptoms subsided within twenty-four hours and the pupil responded more promptly to atropin. As in case 1,

the gummata gradually disappeared, the eye cleared up, and at the end of two weeks there was no sign of the new growths. Vision increased from light perception to 6/20.

Case 3.—Mrs. D., aged 53 years, widow. Was seen March 26, 1912. Denies having had syphilis, but gives a history of a secondary eruption. Complains of pain in the eyes over the eyebrows. The pupils are small and react to light poorly; the irides are muddy in color and swollen. Undergoing no constitutional treatment. Diagnosis: specific iritis; Wassermann positive. April 3, 1912, salvarsan was given intravenously. As in cases 1 and 2, the patient felt very uncomfortable for twelve hours following the injection and the eyes became more congested and quite painful. After forty-eight hours there was less congestion and the pupils reacted more promptly to atropin. At the end of ten days the rash had disappeared and the eyes to all appearances were well.

The main points of interest were: First, that in cases 1 and 2, where mercury was not used, the results were as good as in the other case—in fact the gummata appeared in case 2 while she was under mercurial treatment. Second, that in each of the cases, forty-eight hours after the salvarsan was given, the pupils responded more promptly to the atropin than they had done previously. Third, that all three were ambulatory cases, the salvarsan being given and then the patient allowed to go home.

Discussion.—Dr. Patterson said that in his experience salvarsan gave quicker results in specific eye lesions than any other antisyphilitic treatment.

Dr. Jackson said he had seen case 2. The iris had a distinct reddish color, and he was impressed by the large size of the gummata. Very shortly after the salvarsan was given there was a noticeable decrease in their size.

Dr. Bane wished to know if more than the one dose was given in each case.

Dr. Hilliard would follow up with mercury.

Dr. Neeper thought that with salvarsan it was best to wait a month before giving the second dose and in the meantime repeat the Wassermann. Would follow it up with potassium iodid for its eliminating qualities, thus tending to prevent the toxic effect of the salvarsan.

Dr. Crisp thought the ambulatory cases suffered no ill effects from taking the injection under such conditions.

Dr. McCaw was of the opinion that the reason mercury did not bring about a cure in many specific lesions was on account of its not being pushed to the full physiologic limit.

Dr. Coover said only the one dose of salvarsan was given in each case, and mercury was being used in all of them at the present time.

Small Spindlecell Sarcoma of the Ciliary Body.

Dr. Coover also reported the history of a case of small spindlecell sarcoma of the ciliary body in a woman sixty years of age. The patient was first seen July 6, 1911. About two years previous she had noticed a dimness in the vision of the right eye, which gradually became worse until the vision was reduced to light perception. The eye was watched for a year by an optician, who made a diagnosis of cataract. At this time there was some pain, but she had not suffered previously. The attack lasted about twenty-four hours and the eyeball pained when she pressed on it. Examination showed tension plus 1 with some congestion of the ciliary region. A dark brown growth lay in direct contact with the anterior surface of the lower half of the iris. It appeared to come from behind that structure and extended upwards to the edge of the pupil, pushing the lens backward. The lens was opaque. The growth measured in situ 8 mm. at the base and 6 mm. at the apex. Diagnosis: melanotic sarcoma. Enucleation was advised and performed four days later. Dr. Francis Lane of Chicago examined the specimen microscopically and reported it to be a small spindlecell sarcoma, originating from the ciliary body. No remnant of this structure or the root of the iris escaped destruction, except a few blood vessels. The dark color of the tumor was due to the presence of large masses of hematogenous pigment.

Discussion.—Dr. Sisson had seen the eye previous to operation and had read the pathologist's report. He considered the case a classical one, and in view of the rarity of sarcoma of the ciliary body, only about fifty having been reported, one of extreme interest.

Paralysis of Third Nerve.

Dr. Edward R. Neepor reported a case of complete paralysis of all the branches of the third nerve following an injury sustained by falling from a bicycle. Paralysis was immediate. Examination showed the presence of a distinct notch at the junction of the frontal process of the malar bone with the external angular process of the frontal bone, as if the two had been separated at this point, and, as far as could be ascertained by digital examination, it appeared that the separation continued along the line of the suture between the frontal and malar bones. He felt sure there must be a fracture of the bones at some point, possibly involving the sphenoidal fissure at the apex of the orbit, with resultant injury to the nerve. He desired to know whether in this class of cases it would be possible, by incising the soft parts, to reach the bony walls and replace the broken fragments, and if such an operation had ever been performed successfully.

Discussion.—Dr. Coover was inclined to think the paralysis due to a hemorrhage and that it would disappear in time.

Dr. Walker said in this class of cases he always made it a point to get the direction of the blow, and then made deep pressure on the structures in the opposite direction. He felt sure he had obtained results in some cases by this method. X-ray examination would be an aid in diagnosis.

Enucleation of the Eyeball Followed by Profuse Hemorrhage.

Dr. George Libby reported the history of a case in which he removed an eyeball that had been blind for forty years following an injury. Profuse hemorrhage accompanied the enucleation. Examination showed localized arteriosclerosis, and the lens was found to be completely calcified.

Fragment of Dynamite Cap Imbedded in the Iris.

Dr. E. O. Sisson cited a case history in which a piece of dynamite cap was imbedded in the iris. The interesting feature of the case was that while it appeared to simply lie in contact with that structure, it was found upon removal to have a hooked process on one end, which had imbedded itself in the tissue of the iris. As the result of this, in removing it an ex-

tensive iridodialysis was produced. The fragment measured 2 mm. by 5 mm. Fair vision was preserved.

Exhibition of New Appliances.

Dr. Edward Jackson showed a new trial case designed by him (see *Ophthalmic Record*), and Dr. D. H. Coover a new electric operating lamp possessing a maximum amount of light with a minimum amount of heat.

ELLET O. Sisson,
Secretary.

OPHTHALMIC SECTION

ST. LOUIS MEDICAL SOCIETY.

Meeting of February 7, 1912.

A Simple Lacrimal Syringe.

Dr. W. E. Shahan exhibited a syringe that consisted essentially of an ordinary dropping tube into the end of which is fused a piece of platinum tubing. The platinum, or platinum-iridium, can be obtained from most drug stores in the form of hollow needles of various sizes for use as hypodermic points. These can be cut into lengths suitable for lacrimal syringe points by means of a fine file. With the same file, or with an oil stone, the end of such a point can be dressed down to any desired degree of sharpness or bluntness for entering the canaliculus. This is then fused into the small end of an ordinary glass dropping tube which carries on its large end a rubber cap or bulb.

The coefficients of expansion of platinum and glass are so nearly alike that the two materials adhere readily and firmly together and the glass is not cracked nor the platinum broken away from it by inequality of expansion during rapid changes in temperature, as in boiling.

With these simple materials any one can supply himself with a series of neat, efficient syringes which are easily sterilized, always ready for use, easily manipulated and of very little expense. Such syringes can also be used for irrigating the anterior chamber, where that is desired after certain operations, or in injecting fluid into the accessory nasal cavities, or, with very sharp points, for making subconjunctival injections, etc.

Discussion.—Dr. Loeb: I would like to ask if boiling the syringe does not destroy the elasticity of the rubber bulb.

Dr. Ewing: I have used the syringe myself for some time in place of the one that, as some of you may remember, I suggested a number of years ago. It is more easily controlled than those with a piston. The ease with which it may be ster-

ilized is a valuable consideration. I have found it very reliable, and with the finer points there has been no trouble in entering the smallest canaliculus with it.

Dr. Gross: I saw the syringe that Dr. Shahan devised a couple of years ago, with a gold point and glass, and after some little experimentation I succeeded in making some for myself and have used them ever since, and I would not want to be without them. I found them very satisfactory. I find that I can sterilize them very well in strong carbolic acid and other solutions, and have not found it necessary in that way to boil them. Even with a gold point I find they are very satisfactory, and I should think with a platinum point they would be even much better.

Dr. Green: Dr. Shahan was kind enough to give me one of these syringes, and I have used it on one or two occasions and found it very satisfactory. I have been using the ordinary Dunn syringe, and Dr. Shahan's device, in its easy manipulation and general lightness, resembles this syringe very much. Dr. Shahan mentioned the possibility of using a syringe of this type in irrigating the anterior chamber. Last September I saw, at the New York Eye and Ear Infirmary, a glass syringe with a delicate curved tip for irrigating the anterior chamber, and it struck me at the time that that was too fragile an instrument to use under those circumstances. I could readily imagine that a sudden turn of the eye might break off the glass point in the anterior chamber. Now, if you had a metal or platinum point, that danger would be eliminated.

Dr. Jennings: I am sorry I did not hear all of the doctor's paper. Some years ago I discarded the use of the ordinary lacrimal syringe as being too clumsy and now use an ordinary hypodermic syringe with a special olive pointed tip. It strikes me that this point is rather sharp and you might make a false passage with it. Often when there is a stricture at the top of the nasal duct I find it is a great advantage to put the tip of my syringe into the lacrimal sac and even into the duct. In ordinary cases, however, I can see that this syringe has many advantages over the usual type of lacrimal syringe.

Dr. Shahan, in closing: With regard to the boiling of the syringe, of course the rubber caps are subject to the usual heat restrictions. But these can be boiled a number of times without harm. When one has been used until it fits too loosely,

throw it away and put on another. As to their fragility, they will stand enough force to permit of the insertion of the point into the tissues. With regard to the tip being too sharp, that is possible with some of these I have here this evening. Platinum is rather soft, and it is an easy matter to vary the sharpness or the bluntness of the point to suit varying tastes and conditions. This is done with a fine file or oil stone.

Implantation Operations as Substitutes for Simple Enucleation of the Eye.

Dr. John Green, Jr., discussed various methods recently proposed as substitutes for simple enucleation of the eye. All aimed to secure a more solid basis for the glass eye, so that it might have more prominence and a greater amplitude of lateral and vertical motion.

In Mules' operation, a glass sphere is sutured into the eviscerated scleral cup. In successful cases the cosmetic result is excellent. Fear of sympathetic disease has prevented the general adoption of this method.

Within the past two years operators have sought by implanting various substances, solid and semisolid, into Tenon's capsule, to create a more or less prominent stump. Efforts in this direction have been along two lines: (1) The implantation of solid balls (mainly glass, gold, or platinum), or (2) the implantation of fat tissue into Tenon's capsule.

The Frost-Lang operation (implantation of a metal ball in Tenon's capsule) is strongly advocated by Sweet, who is convinced that the danger from sympathetic disease is insignificant. Motility of the prosthesis is remarkably good, measurements of the arc of rotation of the artificial shell in twelve cases showing an average upward rotation of 23° , downward of 40° , inward of 21° , and outward of 19° .

Schmidt performs a typical Mules' operation, but substitutes for the glass balls spheres cut from the femur heads of oxen, which have been calcined over a Bunsen burner.

Fat implantation was first suggested by Barragner in 1901. Recently Marx, experimenting on rabbits, eviscerated and filled the scleral cavity with fatty tissue. Subsequent histologic examination showed new vessels penetrating the fatty tissue, associated with the formation of young connective tissue. Eventually the fat cells disappeared, but fat and necrotic tissue remained for a long time in the cavity.

Lauber has implanted fat in Tenon's capsule on thirty-seven occasions. A suitable piece of fat, obtained by making an L-shaped incision in the abdominal parietes, is placed in Tenon's capsule, which is closed by catgut sutures. The recti tendons are approximated and the conjunctiva closed with interrupted silk sutures.

Terrien and others have had a considerable degree of success implanting the eye of a rabbit in Tenon's capsule according to Frost's method. Another suggestion is that of Haseltine, who implants a ball made of catgut.

The various implantation methods outlined above uniformly provide a good bed for an artificial eye. Occasionally the cosmetic result is so perfect that it is difficult for the casual observer to tell which is the natural and which the artificial eye. Cases of sympathetic disease have been reported after these procedures, but in no case is it certain that the sympathetic trouble might not have arisen even after a simple enucleation.

Discussion.—Dr. Shahan: I would like to say, with regard to the selection of material for implantation, as Dr. Green has indicated, it is very difficult to know just what is best. It is well known that glass, after prolonged contact with even weak alkalis, such as the lacrimal secretion, slowly becomes eroded, and if the commonly experienced extrusion of glass balls in the past has been due to irritation of surrounding tissues by such an eroded surface, then the greater security of implantation provided by the Frost-Lang operation will postpone but not obviate the ultimate extrusion of the glass ball. Happening to be in Wiesbaden in 1909, one of the Muellers, who was extending me the courtesy of explaining the technic of glass eye making, volunteered the information that of all the glass globes he had known of being implanted, only one was still doing service after fifteen years, and others had been extruded. On theoretic grounds it appears to me that paraffin, particularly the harder varieties, might offer more promise of permanency and freedom from mechanical irritation than glass.

Dr. Shoemaker: Dr. L. Webster Fox told me he had formerly used the glass balls, but that he was not satisfied with the results, so he discarded the use of them entirely and for some time had been using gold balls. He has used the gold balls in quite a large number of cases, and he is very much in favor of the operation with these balls. He thinks it gives a much better result. Personally, I see only one advantage in it,

and a number of disadvantages. The advantage is that it does prevent the sinking of the upper lid which is noticed sometimes when the globe is enucleated. The disadvantages that I see are, in the first place, it makes a much more difficult operation, and in the second place, you cannot use a reform eye, but have to use a shell eye over a ball of that kind, and the shell eyes having sharper edges are much more irritating than the reform eye, and moreover they are much more easily broken. I can see a decided advantage in the use of a ball implanted in Tenon's capsule, as this is where we limited the use of a shell eye, as it has a cavity in the back of the shell which becomes filled with tears, and certain movements of the eye will cause the tears to gush out over the cheek, which is very annoying. With the reform eye the cavity is much smaller. I do not know that we get any better motility with the implanted ball than without it, although Dr. Fox seems to think that we do. However, I have seen just as good motility with the reform eye without the implanted glass ball back of it as we have in most cases with it.

Dr. Woodruff: I suppose this is hardly the time to discuss the advantages of evisceration over enucleation. I would like to relate an experience I had with a gold ball that had been implanted some fifteen years previous to the time I saw the patient. There was plainly a sympathetic irritation set up in the fellow eye, which promptly subsided when I removed the gold ball. It was somewhat rough, but I think that was in the making and not as a result of the secretions acting on the ball. It seems to me that if we put a reform eye over the muscles as they are naturally inserted, instead of putting in sutures, we will get a better adaptation of the reform eye to the muscular insertion, and I believe will get better motion than we could with these implantations. The added risk of inserting a foreign body in the capsule is to be taken into consideration. The patient has but one eye, and I think there is greater danger of irritation and inflammation when a ball has been inserted than when it has not, and a patient with one eye cannot afford to take such chances.

Dr. Shahan: I would like to ask Dr. Woodruff, with regard to this last case, whether there was tenderness or inflammation around the ball at the time the inflammation started in the other eye.

Dr. Woodruff: Yes, there was.

Dr. Loeb: About two years ago quite an extensive article appeared in French, by Dr. C. Bonnefen, which went very extensively into the question of implantation of foreign bodies in Tenon's capsule. He divided it into three divisions: first, those of foreign bodies of the character of metal; second, of the character of sponge, etc.; and third, foreign bodies consisting of actual living tissue. The first he discarded absolutely, as he said that sooner or later they always come out; and the second also were not of value, because they were more or less absorbed and the stump shrank so that the prothesis did not get any better support than if a simple enucleation had been done. The third, the implantation of a rabbit eye in Tenon's capsule, according to the method first used, was also a failure for the reason that the cornea sloughed and the eye, acting as a foreign body, came out. Then the idea of turning the eyeball around so that the cornea, instead of facing forward, faced backward, was adopted, and by suturing the recti muscles over this and then the conjunctiva over that, uniformly good results were obtained. The stump always remained in situ, there was never any sympathetic ophthalmia, and the results were very good. I have had no experience with this, but the first time a suitable case comes up, I shall use the method.

Dr. Green, in closing: I am not in a position to take sides on this question, one way or another. I feel that if we can, with safety to the remaining eye, produce a better cosmetic result with greater motility of the artificial eye, we ought to do it. In regard to paraffin implantations, the experience of Dr. Chas. N. Spratt might be of some interest. Some years ago, Dr. Spratt wrote a paper on the basis of his experience and that of other operators with the implantation of paraffin spheres in Tenon's capsule. The stump was prominent, there was no sinking in of the upper lid, and the prothesis was movable. Many of these operations were performed at the Massachusetts Charitable Eye and Ear Infirmary, and some of the patients were kept under observation for varying periods. In some the ball had been extruded, in others the paraffin had broken into fragments and had become disseminated in the tissues of the orbit. (Above statement is based upon information supplied by several attending surgeons of the Eye and Ear Infirmary, with whom I had the opportunity to discuss the

matter last summer.) So, apparently, paraffin is not a good substance for implantation. If we take Sweet's figures as representing with some degree of accuracy the degree of motility after a solid implantation, the motility is surely much greater than the motility of a reform eye after simple enucleation.

**Report of a Case of Retinitis Pigmentosa Sine Pigmento.
Exhibition of Patient.**

Dr. J. F. Shoemaker reported a case of degeneration of the retina, with concentric contraction of the visual fields to within five degrees of the point of fixation, in a young man 26 years of age. There is no history of any other case of this trouble in either his immediate or distant relatives, and no consanguinity on the part of the parents. The visual disturbance has come on since he was twenty years of age, although he could not see well at night for a time following an illness when he was five or six years of age. After a short time this disappeared and no trouble was noted until after he was twenty years old, when the night blindness returned. His central vision, which is impaired by posterior capsular cataracts, is 18/48+ in the right eye and 18/60— in the left eye. The retinal arteries are markedly contracted, and there is a slight paleness of the optic nerve heads. No deposits of pigment in either the retina or choroid. He has vision in the temporal field from 60 to 90 degrees in the right eye, and from 80 to 90 degrees in the left. The degeneration evidently is of the same character as that in retinitis pigmentosa, but in this case the pigment deposits are lacking.

Discussion.—Dr. Post: I would like to ask the doctor whether, in this case, there was any defect in the hearing?

Dr. Shoemaker, in closing: I have not had this man's hearing tested, but it seems to be quite normal. I might say that in addition to this case I saw a case in the O'Fallon Dispensary five or six years ago, a young negro, who, after an attack of illness, came in with markedly contracted fields. The fields of vision were so contracted that he could not walk around without being led, yet his central vision was 20/19. The retinal vessels were even more contracted than in this case. I saw him only once and did not chart his field of vision, but I am sure it was not as large as this man's, but whether he had any peripheral vision or not, I do not know. In view of the theory

advanced by some authors, that the exciting cause may be a fever or some infectious disease, I am inclined to believe this was a case of retinitis pigmentosa.

Meeting of April 3, 1912.

Absorption of Contusion Cataract Without Any Apparent Rupture of the Capsule.

Dr. E. H. Higbee, Jr., presented the following history: Wayne McC., aged 10 years. Was struck in the left eye with an arrow that had a blunt lead point. He was about fifty feet distant from the boy that shot the arrow. The accident occurred on November 19, 1911. Examination showed that there had been some hemorrhage into the iris; anterior chambers deep. Tension, — 2. The lens was cloudy, making it impossible to see the fundus. At no point could there be seen any rent in the capsule, although the pupil was well dilated with atropin; light perception and projection was good.

The eye has been treated antiseptically and a drop of atropin put in the eye each day at the office, while atropin solution has been used at home sufficiently to keep up almost complete dilatation. No other medicine has been used.

Absorption began to take place gradually from below, and the lower fourth of the lens is practically gone and there are some disintegrated masses lying within the capsule. The thickness of the present lens shows that quite a great deal of absorption has already taken place.

Like many cases of traumatic cataract, the lens in this case became entirely opaque, going into the fourth stage of progression cataract development in two days. In this stage the lens is changed into a pultaceous substance and begins to disintegrate. Fuch says: "If there is a gradual loss of water in a hypermature lens, the pultaceous mass dries up along with the nucleus of the lens into a cake-like mass, but if the loss of water ceases after the lens becomes entirely opaque, the lenticular mass grows more fluid in proportion as it keeps on breaking up into smaller parts. If the process continues in a young person, in whom there is no hard nucleus in the lens, the latter becomes liquefied through and through so that the lens consists of a milky fluid."

A lens that has thus become liquefied does not remain unal-

tered, for a gradual loss of water takes place and the disintegrated lens masses are absorbed. Inspissation thus reduces the volume of the lens until, in cases where no nucleus has been present, the entire mass disappears, transformed into a thin transparent membrane.

It is hard to distinguish, in this case, whether it is a cataractous membrane or simply the capsule that lays in the clear space below the lens. Whichever it is, the probability is that later there will be thickened capsular remains, as the anterior and posterior side will collapse and eventually lay against each other. This, no doubt, will produce some thickening which will have a tendency to become opaque.

Discussion.—Dr. Jennings: I remember about seven years ago, I saw a small boy who was struck in the eye with a snow-ball. There was quite a distinct opacity in the anterior portion of the lens. The pupil was somewhat dilated as a result of the injury and I put a drop of eserin in the eye to see what effect it would have on the pupil. The next day the opacity had entirely disappeared.

Dr. Ewing: I think I have never seen just this kind of a case in actual practice, but I reported here a year or two ago an instance in which absorption of the lens had absolutely taken place in a female between 60 and 70 years of age, apparently without any injury or cause whatever. At the time, I looked up the literature on the subject very carefully, but found only a few case histories had been reported, and these were mentioned in Norris and Oliver's "System of Diseases of the Eye."

Dr. Higbee, in closing: I have investigated the literature and have written physicians and asked several here in St. Louis, and none have seen such a case or have reported such a history. As yet the lens has not entirely absorbed, but those who have seen the case will say that absorption is surely taking place. Over half the lens is absorbed now. Whether this is really as unusual as I think it is, I am not in a position to say. I will write Dr. Jackson, of Denver, to ask if he can give me any light on a case of this kind. It would be interesting to follow the case, and this we can do, because the boy can be seen at any time, and as the lens gradually absorbs I will present the patient before the Section.

Gunshot Wound of Orbit Causing Blindness of Left Eye and Complete Temporary Paralysis of Motor Oculi.

Dr. J. Ellis Jennings cited the following history: December 4, 1910, M. H., aged 20 years, was referred to me by Dr. T. L. Hutton, of Willow Hill, Ill. On Thanksgiving day the patient, with a neighbor, went out hunting and became separated in beating through the brush. While out of sight of each other the patient received a charge of bird shot in the face.

Examination.—The face is seen to be thoroughly peppered with shot—some thirty-five to forty can be counted on the forehead, cheeks, nose and jaws. The right eye escaped injury and vision is normal. The left eye was not so fortunate. There is complete ptosis of the upper lid, and just above the inner canthus is a wound showing the entrance of a shot. On lifting the upper lid the eyeball is seen to be turned outward and cannot be moved upwards, downwards or inwards. The pupil is dilated to six mm. and does not react to light, to convergence or consensually. In other words, there was complete paralysis of the motor oculi. Vision of the left eye, no light perception. Ophthalmoscopic examination failed to show the presence of a foreign body. The vitreous was slightly hazy, and three or four small clots of blood were seen in the upper and inner quadrant. The optic nerve was normal.

On March 10, 1911 (three months later), a second examination showed disappearance of the ptosis and paralysis of the motor oculi. There was no light perception. The optic nerve was now distinctly atrophic, with enlarged veins and somewhat contracted arteries. In the lower nasal quadrant is a heavy line of hemorrhage, with atrophy of the choroid and pigment heapings along its borders. The shot that did the damage was seen in the X-ray photograph to be situated three and one-half inches behind the cornea. The shot evidently ranged along the nasal wall of the orbit, cutting the optic nerve as it passed the optic foramen, then through the sphenoidal fissure, wounding the third nerve, and finally becoming lodged in the brain, an inch behind the chiasm.

Discussion.—Dr. Ewing: Was there any general eye disturbance?

Dr. Green: With reference to transitory ocular paralysis following gunshot wounds, I had a very interesting experience

about two years ago. A young man, 25 years of age, came to see me December 5, 1910. On November 12th he was shot from a distance of about thirty feet, the shot being No. 8 drop shot (soft lead). About 160 shot entered the face, shoulder and arm. He was stunned for the moment, but soon staggered up and was able to make his way to his house, half a mile away. He made a rapid recovery from the injury; a great many of the shot were removed and a great many were left. At first he thought his right eye had been shot out, but after a moment he found the vision as clear as ever. The next day he was alarmed to discover that everything appeared double.

Examination.—December 5, 1910, there were numerous scars in the face, shoulder and neck where the shot had entered. The eyes looked alike, no injury to the right. Vision 5/5, either eye; ophthalmoscope: fundus normal right and left. There was no apparent limitation of motion, but on applying the red glass test I made out a vertical and homonymous diplopia, with apparent increase as the patient looked up and to the left. After observing the case for a few days and finding that there was no diminution in the degree of the diplopia, I still could not be sure whether the separation of the images was greater up and to the right or up and to the left, so that I was unable to say whether the muscle primarily involved was the right superior rectus or inferior oblique. An X-ray made by Dr. Hall showed four distinct foreign bodies, two within the nasal cavity. One shot was on a level with the horizontal meridian of the cornea and back as far as the optic nerve entrance, and the fourth was just above and a little to the nasal side of the globe.

I was able to give a perfect relief from the diplopia by placing before the right eye a 12 degree prism, base $62\frac{1}{2}$ degrees up and out. I was greatly aided in securing the exact position of the prism by locating the images on the Cogan prism chart.

One month later the patient reported by letter: "When I have my glasses on I see good, but when they are off the double vision is there just as bad as ever."

On February 9th I received the following letter from the patient: "I am glad to be able to report to you that my eyes are all O. K. They began to get better the 13th of last month.

In five days I could not see at all with my glasses on, so I laid them away, and my eyes have been all right since then."

I was much interested in this remarkable recovery. His letter in reply was as follows: "I have no double vision now. Looking straight ahead, to the right or left, I see as good as I ever did. My sight is as good and strong as it was before the shooting."

I have not heard from the patient since, so I imagine there has been no return of the diplopia.

Dr. Jennings, in closing: In reply to Dr. Ewing's question, there were no symptoms other than the blindness.

Birdshot in Right Eyeball for Nineteen Years Without Causing Sympathetic Ophthalmitis.

Dr. J. Ellis Jennings stated that S. W., age 41 years, had consulted him July 24, 1908, giving the following history: Fifteen years ago, while out hunting, he was struck in the right eye by a birdshot. The eyeball became very much inflamed and painful, and the sight was lost. After four or five months' treatment the eye became quiet. At intervals during the years that followed the eye became very much inflamed and painful, but always quieted down after three or four weeks of treatment. He has been repeatedly urged by various oculists to have the eyeball enucleated, but he refuses because he is afraid of losing his position on the railroad.

He came to me during one of these attacks. Vision of the right eye, no light perception; vision of left eye, normal. An examination of the right eye showed clearly the wound of entrance in the sclera, one-eighth of an inch to the temporal side of the cornea. There is a deep violent colored ciliary injection. The anterior chamber is very deep; the pupil is reduced to a pin point, and the iris is bound down by adhesion. Atropin does not dilate the pupil. All the symptoms point to a chronic iridocyclitis. Tension, + 1. The patient complains of very little pain. Left eye normal. Under treatment consisting of hot applications, atropin and aspirin, the eyeball became free from active inflammation in three weeks. He had a similar attack one year later, which lasted about ten days. I again strongly urged enucleation, pointing out the very grave danger to the other eye, but he refused to have it removed.

Discussion.—Dr. Higbee: In speaking of a shot in the eye, I have a picture of a case of Dr. Jennings', taken about twelve years ago. I believe that it is one of the first X-ray localizations of foreign bodies in the eyeball. The patient was an engineer on the Cotton Belt. This man I saw three years afterwards, and he had had no sympathetic trouble. There was a question as to whether the shot was in the eye or not. I had three pictures made from the side of the face. I had the man look straight in front for the first; up, the second, and in the third, look down. You can see the shot in all of the different positions, which determined the fact that the shot was located in the eyeball.

Dr. Post: In the early days of X-ray diagnosis I had a patient 61 years of age, who, while shooting, was struck in the face by four birdshot, three striking the lower jaw and one penetrating one of his eyes. The X-ray pictures were not satisfactory. But as the eye, though blind, was quiet and the injury was done by shot fired from a gun, which I thought diminished their chance of being germ carriers, I did not remove the wounded eye. I saw the patient several years afterwards; the blind eye was still comfortable and the other eye normal. I have never heard from him since, and presume that he spent the remainder of his life in comfort, as far as his eyes were concerned. He was not only a patient, but a personal friend, and, without doubt, would have consulted me if he had had any further trouble.

Dr. Jennings, in closing: There are many cases on record in which a foreign body has remained in the eye for long periods of time without causing any symptoms of irritation or inflammation. This is accounted for by the setting up of a local inflammation which surrounds the foreign body with connective tissue and thus keeps it from doing any harm. But in the case reported this fortunate outcome had not occurred, and there is every reason to suppose that sooner or later the second eye will be lost through sympathetic ophthalmitis.

Report of Two Cases of Conjunctivitis Vernalis.

Dr. Julius H. Gross, in a paper on conjunctivitis vernalis, stated that in 1846 Arlt expressed himself as follows: "Without marked inflammatory symptoms preceding, or being present, I saw the conjunctival border of the cornea, through infil-

tration of a grayish yellow, transparent, gelatinous mass, raised and changed into a more or less diffused swelling." In 1871 von Graefe described it under the term of *phlyctena pallida*. Later descriptions were given by Brockhaus, Des Marres, Camuset and Vetsch.

Case 1.—Male, three years old. Aside from considerable swelling at the corneal limbus, and a grayish white arc in the superior portion of the cornea near the limbus in each eye, the appearance was very much like phlyctenular conjunctivitis. Improvement under the use of zinc and boric acid.

Case 2.—Male, six years old, brother of case one. When an infant the patient had nasal trouble, and as a result of this there is some depression of the bridge of the nose. This case presented similar limbus and corneal lesions, and the customary milky conjunctiva. Under zinc and boric acid the symptoms subsided, with recurrence the following year. An improvement was then noted after a change in climate. In both cases there was enlargement of the glands of the neck and face.

Discussion.—Dr. Higbee: I remember about a year or two ago of reading an article in which the author spoke of shaving off the conjunctiva. That appealed to me as a very severe operation without a reason. He spoke of having used applications of silver and caustics without satisfactory results. The case had been a recurrent one, and the thickening became so severe that he shaved the conjunctiva. His results were not satisfactory. I have had excellent results with simply the cold application of boric solution. I find that my patients get the most relief from the cold applications, applied as often as they need it—about every two hours. I have discarded almost everything but the cold application of boric acid.

Dr. Green: This is a very interesting subject to me and deserves free discussion. It has been my impression that some cases of spring catarrh are mistaken for trachoma. I have two cases in mind that came to me after having been treated by other oculists, and the history they gave led me to believe that the diagnosis of my predecessor in each case had been "trachoma." It seems to me that such an error ought not to be made. As Dr. Gross has pointed out, the points in diagnosis are reasonably clear, and, of course, the treatment with caustics and astringents, indicated in trachoma, is contra-indicated in spring catarrh.

As to treatment, bland lotions with very mild astringents associated with adrenalin and periodic iced applications have served me well as palliative measures.

Dr. Gross, in closing: I believe that these two cases must have been very characteristic cases, because there seemed to be no resemblance to trachoma. It seems that there are three classes of these cases. In some only the region just around the limbus of the cornea is affected. Another type is that in which the lids are affected, and the third type is that in which you have both the globe and the tarsal conjunctiva affected. They did not look at all like trachoma cases. Anyone with experience with trachoma would not mistake them for trachoma. I have seen a case at the eye clinic, probably within the last year, that we took to be conjunctivitis vernalis. It looked very much like trachoma. I suggested it might be a mixed infection. The peculiar salmon color is quite characteristic and would help one to differentiate from trachoma.

The eldest boy was fairly well, but had had trouble with his nose when small and was somewhat more delicate. The irritation made the eyes appear quite sore, but he was attending school and seemed to be getting along quite well. Perhaps it was more the solicitude of the parents that brought these children to the oculist than the complaints of the boys themselves. These cases were the first cases of conjunctivitis vernalis I had ever seen, although I had seen many thousands of eye cases; at any rate, none had ever been pointed out to me. They puzzled me for a long time. I was led to report them, partly on that account and partly because of the very heroic treatment advised in Noyes' textbook, a writer we usually regard as very conservative.

If a patient cannot be sent to a cooler climate, he can at least be kept in the shade. When we carry that out, the trouble seems to subside. Another interesting feature is that the sisters did not develop the trouble. The disease seems to be more prevalent among the males than the females. Statistics vary from 90 per cent males down to 40 per cent, so that some might hold that the percentage of the disease is larger among the females.

J. G. CALHOUN,
Section Editor.

WILLS HOSPITAL, OPHTHALMIC SOCIETY.

Meeting of May 7, 1912. Dr. William Zentmayer, Chairman.

An Unusual Example of Recurring Transient Failure of Vision.

Dr. S. D. Risley presented for study a man, 61 years of age, who had come to the clinic in November, 1908, with his left eye blind from simple glaucoma. Up to that time there had been no inflammatory symptoms or pain. In the right eye the vision was 6/12, no contraction of the field, and no cupping of the nerve. A year later he had returned with a fulminating attack of acute inflammatory glaucoma, for which the ball was removed. The right eye remained as in 1908. In January, 1912, he suffered an attack of pneumonia, during the course of which the right eye became red and painful, and he says "nearly blind." He was not able to return to the clinic until March, when the eye was injected; the anterior chamber quite obliterated; the pupil dilated; the tension normal; the cornea transparent but anesthetic; the field of vision concentrically narrow; the vision was 2/30. He complained only of transient attacks of nearly complete blindness, coming on when first awakening in the morning, but disappearing gradually, until before noon it would resume its normal state. During these attacks the tension was but little if any greater than during the intervals. At times even between the attacks the cornea was steamy. Ophthalmoscopic study of the fundus was difficult, at times impossible. The lens was gray, and there were vitreous webs, but with the strong light of the electric ophthalmoscope marked cupping of the nerve could be demonstrated.

Dr. Risley presented the case for study and discussion; not for the relation of the case to the general subject of glaucoma, but as to methods of treatment, emphasizing the fact that the man had but one eye; that the anterior chamber was practically obliterated. Operative interference was necessary, but what procedure should be chosen—iridectomy, or one of the more recently devised operations for the reduction of tension?

Discussion.—Dr. Posey said that on account of the inflam-

matory symptoms, some form of operation seemed necessitated, for he was doubtful whether miotics could maintain vision under such circumstances. On account of the shallowness of the chamber, the cutting of the field of vision and the increased tension, he thought that the most conservative form of operative procedure should be chosen, and advised the performance of the operation of cyclodialysis, in preference to that of iridectomy, the former procedure being much less likely to be followed by intraocular hemorrhage and loss of the visual field.

Dr. Zentmayer said that he agreed with Dr. Posey that some operation other than iridectomy should be done. The choice lay between cyclodialysis and posterior sclerotomy, and he favored the former. The fact that the reduction of tension after this operation is apt to take place gradually, sometimes as late as forty-eight hours, was an element of safety in many cases of glaucoma.

Dr. Risley, in closing, agreed fully with the reasoning of Dr. Posey and Dr. Zentmayer, and would adopt the method suggested. He remarked in passing that the obliteration of the anterior chamber was difficult to explain. Was it due to the absence of aqueous humor, because of the interference with the functions of the ciliary body, or had it escaped backward between the sclera and uvea? He alluded to two cases of glaucoma occurring in his private practice, in both of which the aqueous humor had disappeared from the anterior chamber on the fifth day after iridectomy, and after the wound had closed and the chamber fully formed. In one of these vision was lost; in the other the detachment of the ciliary body and choroid in the upper temporal quadrant was demonstrated by Dr. de Schweinitz and himself, but was replaced in ten days by complete rest in bed, electric light sweats, eserine and dionin, and large doses of calcium chlorid internally, the patient recovering with a normal field and visual acuity of 6/7.5.

Secondary Glaucoma Following Iritis.

Dr. Posey showed a man with secondary glaucoma from pupillary occlusion, complicating an acute attack of iritis. He dwelt upon the therapeutic problem which cases of this nature presented. Mydriatics are often harmful on account of their tendency to increase intraocular tension, while miotics in-

crease the inflammation in the iris and the ciliary body without lowering the tension. He thought iridectomy in acute iritis useless, on account of the coloboma filling in with inflammatory material and the purpose of the operation defeated. He relied in such cases upon mercurial inunctions, salicylate of soda internally, dionin, and the alternate use of weak doses of atropin and pilocarpin.

Discussion.—Dr. Risley said that he had not hesitated to operate on these cases, but preferably between the recurring attacks of acute exacerbation. He thought it important to relieve the tension as soon as possible, or the eye would be destroyed by secondary glaucoma. He related one case in which the collection of the products of inflammation back of the iris forced it into contact with the cornea, the pupillary border firmly bound to the anterior capsule. He had carried the blade of the keratome through the corneal limbus directly into the projecting iris into the posterior chamber, and by lateral movements of the blade enlarging the opening as much as possible. In withdrawing the blade slight pressure backward was made on the posterior lip of the wound and a yellowish, viscid fluid escaped. The procedure was followed by relief of pain and rapid improvement of the eye, but an iridectomy was done later to secure free communication between the anterior and posterior chambers. He regarded iridectomy in recurrent iritis with extensive posterior synechiae as a most valuable procedure in that disease, but where possible it should be done between acute exacerbations.

Successful Removal of Lenses Dislocated Into the Vitreous.

Dr. Posey exhibited a Hebrew child, 10 years of age, upon whom he had successfully removed the lenses of both eyes from the vitreous. Both lenses had been primarily subluxated from birth, due doubtless to a weak zone of Zinn. Both eyes were operated on under ether. In the right eye the lens was extracted with but slight loss of vitreous following the incision through the cornea. In the left eye the use of the loop was necessary with again but slight loss of vitreous. Dr. Posey commented on the ease with which the lenses were removed, and said it was surprising how little vitreous loss had occurred. He thought that the loop was often applied in a faulty manner, and dwelt upon the necessity of applying the instrument

to the lens in a manner somewhat to that in which the blade of the obstetric forceps is applied to the head during labor. Healing had been prompt, and with high spherocylindric lenses, satisfactory vision was obtained in both eyes.

Discussion.—Dr. Risley suggested that less injury to the vitreous would be done by engaging the lens with a sharp tenaculum instead of using the loop or spoon as a vectis. He thought that the surprising ease with which these dislocated lenses had been extracted might be due to the fact that the vitreous was not fluid and they had slipped downward and backward between the consistent vitreous and retina, and retracted the same course readily under slight pressure.

Dr. Zentmayer asked Dr. Posey whether he had ever had the opportunity to find out the terminal result in cases of dislocated lenses into the vitreous removed by the vectis. His experience with the operation in traumatic cases was that subsequent detachment of the retina sometimes resulted.

Salvarsan in Interstitial Keratitis Due to Congenital Syphilis.

Dr. Posey, in a paper on the use of salvarsan in parenchymatous keratitis due to congenital syphilis, cautioned against the use of the drug in this class of cases, for he had seen increased haze of the cornea with exacerbation of all symptoms following same twenty-four or forty-eight hours afterward in four or five cases after a single dose of the drug. He referred to the literature on the subject, and said that Stuelp had published in the *Klin. Monats blatter für Augenheilkunde*, March, 1911, p. 371, a collection of 111 cases of parenchymatous keratitis due to congenital syphilis. Rapid healing had followed in three cases, marked improvement in four cases, tendency to clear in six cases, a favorable influence in sixteen cases, rapid improvement in six cases. Improvement, but only after a second injection, in two cases. Improvement, but followed by relapse, in five cases. No success, even after two or three injections, in sixty-nine of the cases.

In the same journal for February of this year, Wiegmann has continued Stuelp's researches and reports that of eighteen cases, Ulthoff saw doubtful improvement in but three cases, nine were apparently uninfluenced, and in two inflammation increased. Benda had no success in twelve cases; indeed, the second eye got worse. Manzutto saw not the slightest im-

provement in four cases. Wessely concluded from a study of seventy cases in German literature that salvarsan had no power to favorably influence the course of the disease. Japanese ophthalmologists report the same.

In corneal affections due to acquired syphilis, on the other hand, the reports are more favorable, Manzutto, Becker and Igersheimer all reporting successful cases.

Discussion.—Dr. Zeigler had seen two cases of his own and one of Dr. Oliver's. Two of these were markedly improved, while one was uninfluenced. He said that Ehrlich had stated that affections of the auditory nerve following the administration of salvarsan were due to the setting free of toxins following the destruction of the spirochetes, and if a second dose were given in about a week this would soon clear up.

A Caution Against the Indiscriminate Prescribing of Glasses in School Children.

Dr. D. F. Harbridge read a paper in which was urged the necessity for a rather more conservative use of glasses. The remarks applied only to school children up to possibly the age of 14 or 15 years, in which there was present low degrees of simple hyperopia or low hyperopia with a low amount of hyperopic astigmatism, the axis of the cylinders being symmetrical, and the asthenopic symptoms rather indifferent. The writer believed it highly desirable that a cycloplegic be instilled, and the static refraction accurately determined in each case referred to the oculist by the school physician. If the degree and character of the refraction and the symptoms warrant correcting lenses, they should be prescribed. If, however, the merits of the case do not warrant the use of correcting lenses, a frank statement to the effect that they are unnecessary should be made to parents. The essayist referred to many instances illustrating the absurdity in the indiscriminate ordering of glasses to satisfy the "wants" of an impressionable child, rather than determining their real "needs."

Discussion.—Dr. Zentmayer thought Dr. Harbridge's paper timely, and agreed with much that it contained. He thought, considering the large amount of reserve accommodative power possessed by a child under 12 years of age, that simple hyperopia, even in the presence of a low degree of astigmatism, does not necessarily call for correction. If headaches and astheno-

pia are complained of, it would be far better that the child be taken from school until its physical powers could be developed. Often, however, because of the indifference of parents, there is no way of affording relief other than by the correction of the error of refraction. He thought that the most common cause of asthenopia was poor illumination.

Dr. Risley agreed with Dr. Harbridge in his thesis. He thought that if asthenopia were present in a young person with a refractive error in each eye not greater than plus .50 D., some other cause for the symptoms should be sought for—for example, impaired general health or anomalies of binocular balance. In his own examination of school children's eyes, he had called attention to the fact that all the cases of refractive error discovered, in only 60 per cent was the error high enough to cause asthenopia or ocular disturbance of any kind.

J. MILTON GRISCOM,
Secretary.

BOOK REVIEWS.

Diseases of the Eye.

By J. HERBERT PARSONS, D. Sc., M. B., B. Sc., F. R. C. S.
Published by P. Blakiston's Son & Co., Philadelphia. Price,
\$4.00.

This is the second edition of this work, and the reviewer desires to commend, first of all, the general make up of the book. It is rare that one finds, even in works on ophthalmology, paper and printing which conforms so well to the best optical standards. The drawings, both plain and colored, are exceptionally good. The text is worthy of the pen of the distinguished author. It is one of the best of the shorter works on ophthalmology. C. L.

The Treatment of Shortsight.

By PROF. DR. J. HIRSCHBERG, Berlin. Translated by G. LINDSAY JOHNSON, M. D., F. R. C. S., Johannesburg. Published by Rebman Co., New York.

This book of 120 pages is a translation of a lecture by Prof. Hirschberg, based upon his own experiences, but replete with citations from the literature. The causes and complications of myopia are discussed, and emphasis is laid on the danger and discomfort of total correction of high myopia. General rules are given for the prescribing of glasses, which are worthy of the attention of the most experienced as well as the beginner in ophthalmology. C. L.

The Ocular Muscles.

By HOWARD F. HANSELL, A. M., M. D., Professor of Ophthalmology in the Jefferson Medical College, etc., and WENDELL REBER, M. D., Professor of Ophthalmology in the Medical Department of Temple University, etc. Published by P. Blakiston's Son & Co., 1912. Price, \$2.50.

This is a book of 220 pages, illustrated by 3 plates and 82

other illustrations, and deals with the anatomy, physiology and pathology of the external ocular muscles. One who desires to review his knowledge of this subject, or look up some point concerning which he is in doubt, will find this a ready reference book. C. L.

Textbook of Ophthalmology—Volume I.

By DR. PAUL ROEMER, Professor of Ophthalmology at Greifswald, translated by DR. MATTHIAS LANCKTON FOSTER. Published by Rebman Co., New York, 1912. Price, cloth, \$2.50.

This is a work of 275 pages, profusely illustrated with drawings and colored plates, treating of diseases of the conjunctiva, cornea, iris and lens. The subject matter takes the form of clinical lectures. As a result, the reader is told the symptoms and shown how to make a diagnosis from them. It is a work that can heartily be recommended to the beginner, and will be valuable even to those who have been in practice for some time. C. L.

The Disturbances of Vision (Die Störungen der Sehfunktionen).

By DR. MED. W. LOHMANN, Privatdozent and Oberarzt der Universitäts-Augenklinik at Munich. Published by F. C. W. Vogel, Leipsic, 1912. Price, 12 marks.

This work of 200 pages, illustrated with 35 drawings, treats of visual disturbances under twelve headings: I. Vision and the Eye: the Meaning of Vision. II. Blindness: Learning to See. III. Visual Disturbances Caused by Refractive Errors. IV. Abnormal Conditions of Central and Peripheral Vision. V. Disturbances of Adaptation and the Light Sense. VI. Color Sense and Its Congenital Disturbances. VII. Acquired Disturbances of the Color Sense. VIII. Chromatopsia. IX. "Color Hearing" and Other Accompanying Symptoms. X. Binocular Vision and Its Disturbances. XI. Visual Disturbances in Diseases of the Visual Tracts and Visual Centers. XII. Mental Pictures, etc.

This is a comprehensive discussion, in a few pages, of a subject which is either neglected or scattered through the pages of the usual textbook. C. L.

Ophthalmic Myology.

By G. C. SAVAGE, M. D. Eighty-four illustrative cuts and six plates. Second edition. Published by the author, 137 Eighth avenue, North, Nashville, Tenn.

This new edition is based upon the same principles as set forth in the first edition, issued in 1902 by Dr. Savage. The first chapter must be thoroughly digested in order to appreciate what follows, which will then be easy reading. It seems to the reviewer that the points at issue, so logically and concisely depicted on pages 32 to 34, are unanswerable. An ophthalmologist not taking the opportunity of studying this volume is doing himself an injustice.

M. W.

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EDGAR S. THOMSON, M. D.....	New York
W. GORDON M. BYERS, M. D.....	Montreal

German.

WILLIAM ZENTMAYER, M. D.....	Philadelphia
ALBERT C. SAUTTER, M. D.....	Philadelphia
FREDERICK KRAUSS, M. D.....	Philadelphia
WALDEMAR E. FISCHER, M. D.....	St. Louis

French.

M. W. FREDERICK, M. D.....	San Francisco
JESSE S. WYLER, M. D.....	Cincinnati

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